

USS OLYMPIA (Cruiser USS OLYMPIA)
Penn's Landing 211 S. Columbus Blvd., Independence Seaport Museum
Philadelphia
Philadelphia County
Pennsylvania

HAER PA-428

HAER
PA
51-PHILA,
714-

WRITTEN HISTORICAL AND DESCRIPTIVE DATA
LARGE FORMAT PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
1849 C Street, NW Rm NC300
Washington, D.C. 20240

HISTORIC AMERICAN ENGINEERING RECORD
U.S.S. OLYMPIA

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HAER No. PA-428

Location: At the Independence Seaport Museum, Penn's Landing, 211 South Columbus Boulevard & Walnut Street on the Delaware River, in the City of Philadelphia, County of Philadelphia, Pennsylvania.

UTM Coordinates:

Zone	Easting	Northing
18	487292	4421286
Quad: Philadelphia, PA. - N.J. 1:24000		

Dates of Construction: Authorized September 7, 1888, Keel laid June 17, 1891, Launched November 5, 1892, Commissioned February 5, 1895

Builder: Union Iron Works, San Francisco, California

Official Number: C-6 (original designation)

Cost: \$1,796,000

Specifications: Protected cruiser, displacement 5870 tons, length 344 feet, beam 53 feet, draft 21.5 feet, maximum speed 21.686 knots, 6 boilers producing 17,313 horsepower. twin screws-triple expansion engines.

Original Armament:

4 - 8" rifles	14 - 6 pounders
10 - 5" rifles	6 - 1 pounders
6 - torpedo tubes	

Complement: 34 officers; 440 enlisted men

Present Owner: Independence Seaport Museum, Philadelphia, Pennsylvania

Present Use: Decommissioned. National memorial and maritime museum.

Significance: U.S.S. Olympia is a partially armored or protected cruiser which was constructed as part of a congressional program to build a new steel United States navy prior to the turn of the century. Her innovative design incorporated modern armament, high speed engines and armor shielding the magazines and propulsion machinery. She is the oldest extant steel-hulled warship in the world.

The U.S.S. Olympia was the flagship of Admiral George Dewey's victorious task force at the battle of Manila Bay on May 1, 1898. During the first two decades of the 19th century she protected American lives and interests in Panama, Dominican Republic, Murmansk (Russia), Croatia and Serbia. She returned the remains of the unknown soldier from France to the United States in 1921. She served as a training ship for Naval Academy midshipmen in 1922. *Olympia* was decommissioned December 9, 1922 and reclassified as a Naval relic on May 23, 1941. U.S.S. Olympia was transferred to the Cruiser Olympia Association on September 19, 1957 then to the Philadelphia Independence Seaport Museum in January of 1996.

Project Information: This documentation was begun July 15, 1996 under a memorandum of agreement between the Independence Seaport Museum and the National Park Service.

Historian: Robert C. Stewart January 1998

Introduction:

In the years after the American Civil War the United States concentrated on developing and settling its western lands. With no serious external threats, the American Navy went from its fighting peak during the war to a fleet ranked twelfth among the nations of the world.¹

As settlers claimed the prime western lands, American business interests examined the investment possibilities of expanding foreign commerce and the prospect of colonies. Expansionist policies with imperialistic overtones were prime factors in the naval expansion of the late nineteenth. They stimulated acquisition of a modern steel fleet for the United States and creation of the industrial and technological base needed to build and support it.

Steel ships had been around for a decade before being seriously considered as U.S. naval vessels. In 1859 the first Bessemer steel merchant ship came down the ways.² A second steel hulled merchant ship, the paddle steamer *Banshee*, was built in Liverpool in 1863. She was intended for use as a blockade runner during the American Civil War.

The first tentative efforts at building American steel warships in the early 1880s produced several mediocre vessels. Hull shapes and engine power were not properly matched. Armor was ineffective or non-existent and armament was obsolescent. Naval architects encumbered the designs with sail rigs; they viewed steam as auxiliary power.³

Yet, by the 1890s designers and shipbuilders had learned from the mistakes made in building the first generation of steel warships. *Olympia's* design was the culmination of a series of successful experimental projects. Her plans took the best from several earlier designs.⁴ *Olympia's* design properly sized her power plant to her

¹Clark, G. S. "Naval Aspects of the Spanish-American War." *Brassey's Naval Annual*. (Portsmouth, New Hampshire, J. Griffin, 1899), 90.

²Kevin Desmond, *A Timetable of Invention and Discovery*, (New York: M. Evans & Company, Inc., 1986), 1859.

³Alden, John D., U.S. Navy (Retired), *The American Steel Navy*, (Annapolis: Naval Institute Press, 1972), 5.

⁴F.T. Bowles, U.S.N. "Our New Cruisers," in *The Proceedings of the United States Naval Institute IX, No. 4*, (Annapolis, Maryland: United States Naval Institute, September 1883), 606.

hull. Armor protected her boilers, engine and powder magazines. The placement of armor designated her as a **protected cruiser**, a design that is discussed in detail below. Additional protection came from the placement of her coal bunkers which formed a buffer between the hull and the power plant. A coffer dam girded the hull at the water line and would prevent sinking if the outer hull was breached. Her plan divided the hull into a series of watertight compartments, a design that insured she would stay afloat under severe battle conditions.⁵

Olympia's armament was proportionate to her displacement. Compared to other warships of the period she was small (Table 1). Still, with a well-trained gunnery crew she was a match for any vessel of similar size. Later events showed that, when skillfully fought, she could defeat larger, even more powerful warships. This report focuses on the story of the *Olympia*, her technological development and her actions to uphold the maritime interests of the United States.

Historical Context - The Post-Civil War American Navy:

World military experts greatly respected the American Navy immediately following the Civil War. John Ericson's ironclad ship, *Monitor*, built in 1862, changed naval warfare forever. Most of the prewar wooden fleet disappeared, replaced by sail powered - steam auxiliary ironclads. Foreign navies admired the United States' post Civil War fleet of swift commerce raiders. Still, American naval superiority did not continue into the 1870s. American interest turned toward settlement of the western states and territories. The new transcontinental railroad was the greatest engineering feat of the era and focused national attention on developing lands west of the Mississippi River.

The Navy deteriorated in the post-war years. The government sold many ironclads for scrap and the remaining decommissioned monitors rusted away in reserve basins. Ship construction at navy yards was almost nonexistent. Lack of funding halted work on vessels under construction.

The navy department abandoned its commerce raiding cruisers and stripped many vessels of their rigging, using them as storage hulks. But the navy maintained an American presence with its

⁵Theodore D. Wilson, "Steel Ships of the United States Navy," in Transactions of the Society of Naval Architects and Marine Engineers, Vol. I, 1893, (Sine loco: Society of Naval Architects and Marine Engineers), 119.

obsolete ships in the ports of China, on the Barbary coast, in South America, and among the whaling fleets.

Black-hulled steam frigates, sloops, and gunboats monitored the sea lanes and defended American interests. The oldest vessels, built of seasoned timber by skilled craftsmen before the Civil War, were in the best condition. Inferior wood, blighted with dry rot, characterized post-war ships.

Muzzle-loading cannon left over from the days of sail formed the inadequate armament for these ships. Although small steam engines were available, the navy relied on human muscle power for working ship. Sailors rowed boats, manually hoisted sail, raised anchors with man-powered capstans and steered with as many as six men on huge triple steering wheels. Songs and chanteys maintained the work tempo and the boatswain's whistle signalled commands.

In the 1880s, sail still dominated steam in the Navy Department. Naval architects designed vessels for sail; they provided space and foundations for engines and boilers only after making provision for the sail rig. Older vessels typically had inefficient low-pressure engines and boilers. Designers concentrated on the proper layout for masts and rigging. If smokestacks had to telescope or fold out of the way to clear a yard or boom, so be it. Engineers specified inefficient two-bladed propellers and detachable shafts to reduce drag under sail. The navy accepted the limitation on steam operation to get optimum range. A medium-sized warship could not carry enough coal to have an effective range of operations; the primary power source had to be the wind. Cost-cutting regulations also discouraged the use of coal.

Congress added twenty-one ships to the Navy roster after the end of the Civil War. Only one exceeded 3,000 tons and designers employed iron only in the five smallest. The rest replicated obsolete, worn-out, and decayed vessels. Starting in 1874 congressional funding did not include any new construction. Seven of the "new" vessels came down the ways as "repaired" ships purchased with maintenance appropriations.

During this period, ex-Civil War military officers dominated politics. National policy focused on internal expansion. External enemies did not threaten our national security. The great land battles of the Civil War established that if the U.S. Army was willing to accept heavy casualties, it could defeat any invader. A large merchant marine and the warships necessary to protect commerce was not a national priority. The financial community favored investments in railroads, real estate and mining. With the unexploited American west close by there was no drive to develop colonies or trading concessions. Congress ordered the Navy to

display the flag, suppress piracy, protect American citizens from harm and spend as little money as possible.

By 1880 restrictive congressional fiscal policy produced a United States Navy that rated twelfth among the fleets of the world. Scientific American, a leading technology journal of the period, reported that European navies were converting to steam, developing improved armament, experimenting with armor and developing advanced battle tactics. While some European ships continued to feature sail rigs, designers omitted wind power from technologically advanced ironclads. Officers debated the tactical effectiveness of heavy ram bows. Some naval architects favored high freeboard while others felt that a vessel running with decks awash presented a smaller target. The European naval establishment seethed with new ideas while continental munitions manufacturers presented the military with a growing arsenal of deadly new projectiles and propellants.

Rapid development and change characterized the technological side of warfare during the 1880s. In the United States, military strategists concluded that the nation needed an all new navy; upgrading existing vessels was not cost-effective. Modern ships could incorporate the latest technology. Warships with rapid-fire, long-range weaponry and high speed hulls could dominate enemies possessing superior numbers of obsolescent warships. American naval planners conceived the steel navy during this era of technological advancement and transition.

Naval Architecture and Engineering - The "ABCD" Ships:

In 1881, during the first year of the Garfield administration, Secretary of the Navy William Hunt named a board of officers to determine the number and types of vessels needed by the navy.⁶ After much acrimonious debate, the board issued a majority report proposing to build sixty-eight steel vessels. Some board members issued a minority report pointing out that the United States did not have the production capability for manufacturing large quantities of steel. The board believed that costs would be excessive and delivery delays would be unacceptable. The board's internal dispute killed the plan. Hunt lost his political clout with the assassination of President Garfield in the fall of 1881. President Arthur then brought in William Chandler as Secretary of the Navy. Under Chandler the Navy's congressional supporters proposed a bill authorizing six steel cruisers and nine smaller vessels. Still Congress did not allocate funds.

The selection of the cruiser class sheds light on the country's foreign policy at the time. Naval doctrine designated the mission

⁶Bowles, "Cruisers", 1883, p. 595.

of a cruiser as carrying information and stores, attacking the enemy's commerce and convoying and guarding our own. Cruisers also would accompany and assist battle ships.

A second Advisory Board recommended construction of a medium cruiser, three smaller cruisers that were in reality enlarged gunboats, and a fast dispatch ship for carrying orders and communications. Congress authorized and funded all except one small cruiser. It appropriated \$1,300,000 for construction. President Chester Arthur signed the bill on March 3, 1883 and brought the American steel navy into being.⁷

The Navy named the vessels *Atlanta*, *Boston*, *Chicago* and *Dolphin*, or as the press nicknamed them, the "ABCD" ships. Commissioning took place between 1885 and 1889. Programs involving new technology seldom run smoothly and the "ABCD" plan was no exception. Only two shipyards, Cramp's of Philadelphia and Roach's of Chester, Pennsylvania, bid on all four ships. Roach was the successful bidder, his total bid being \$2,440,000.⁸ Some scandals of the Grant administration and its Secretary of the Navy, George Robinson, involved Roach. The Cramp interests protested the award and set out to ruin Roach. The Democrats and their friends in the press used the slogan "Roach, Robinson, Robbers" to create public indignation about the contract award.

Roach could have overcome the corruption charges but he had technical problems fabricating steel plate. Then a fire destroyed some vital metal fabrication equipment. After construction was well underway the Navy continued to modify plans and specifications. The yard launched the first ship, *Dolphin*, two months after deadline. The *Dolphin* was intended as for use as a dispatch vessel, capable of quickly transmitting messages and orders from Washington to the fleet. She was designed to maintain high speed for several days. During her sea trials, *Dolphin*'s cast steel propeller shaft shattered. The advisory board had recommended against putting in a cast steel propeller shaft but Roach was willing to install one at his own expense. After the original shaft's failure, Roach managed to get the specifications changed for all four ships, allowing iron to be substituted for steel.

The Navy refused to accept the *Dolphin*, basing the rejection on the shaft failure and other minor defects. The Attorney General invalidated Roach's contract and forced him into bankruptcy.

⁷Alden, Steel Navy, 1972, p. 13.

⁸F.T. Bowles, "Cruisers," 1883, pp. 597-617.

Secretary of the Navy, William C. Whitney then discovered that none of the U.S. navy yards had the capability of completing the *Atlanta*, *Boston* and *Chicago*. The navy then took over Roach's shipyard and completed the work with government personnel. The government had a weak case for rejecting the *Dolphin* and a threatened lawsuit obliged the navy to reach a compromise and accept the *Dolphin*.⁹

Dolphin's speed of 16 knots was passable in 1885 but she was slow by the standards of just a few years later. Perhaps her outstanding contribution was that of a good project for familiarizing naval personnel with steel ship construction.

A team headed by Francis T. Bowles designed the *Atlanta* and the *Boston*, 3,189-ton protected cruisers. Bowles studied naval architecture at the Royal Naval College at Greenwich and the designs incorporated features of the British "Elswick Cruiser" class. Two 8-inch and six 6-inch breech loading rifles provided the main batteries. The bow and stern areas had low freeboard to allow the 8-inch guns a broad arc of fire. The designer rigged them as brigs with square sails on the yards. Single screws minimized drag under sail but limited speed under steam to about 15 knots, too slow for effective commerce raiding.¹⁰

The protected cruiser *Chicago* displaced 4500 tons and was the largest of the ABCD vessels. Construction of a ship this size was about the largest that the American steel shipbuilders could build. She had high freeboard, a three mast bark rig with a prominent bowsprit. She carried modern rapid-fire breech loading rifles and her armament equaled comparable European ships. She had twin screw propulsion powered by obsolescent compound overhead-beam engines and cylindrical boilers mounted over brick fireboxes.¹¹

The ABCD ships lacked side armor. Their displacement was not sufficient to carry heavy armor. This was a major cause of apprehension in the Navy Department's Bureau of Naval Construction.¹² However, the American steel industry did not have the capability for manufacturing quantities of heavy armor plate. The designers got substantial protection by adopting the English

⁹ Alden 14

¹⁰Background on the construction of the "ABCD" shipbuilding program is documented in Alden, *Steel Navy*, 1972, p. 14 and passim.

¹¹F.T. Bowles, "Cruisers," 1883, p. 606.

¹²Extensive documentation of opinions on warship design can be found in F.T. Bowles, "Cruisers," 1883, p. 622.

practice of covering the machinery spaces and the powder and ammunition magazines with a watertight armored steel deck three-quarters to one-and-one-half-inches thick. This "protective" deck extended below the waterline at the side of the hull but curved above the waterline along the centerline. The armored deck protected against plunging fire from shore-based batteries. Coal bunkers above the armor provided additional protection.

Compared to European designs, the ABCD ships offered marginal protection and performance. But, for the U.S. Navy, they were a major departure in size, auxiliary machinery and self-protection. They were a substantial improvement when compared to the navy's 1,000 ton iron ships, *Alert*, *Huron* and *Ranger*, commissioned in the mid-1870s.¹³ The 3189-ton to 4500-ton ABCD ships had double bottoms, compartments sealed off with watertight doors and electric power plants. Their steel breech-loading rifles gave them fire power greater than what would be estimated from outmoded displacement tables.

The ABCD ships proved that Americans had the skills to build steel ships. As the "Squadron of Evolution" in 1889 they served as a training school for the new Navy. After 1900 they shed their sail rigs, received new armament and served as gunboats. The government sold *Atlanta* for scrap in 1912, but the *Dolphin* remained on the Navy list until 1922, used to entertain dignitaries and important government guests. The *Chicago* survived as a barracks ship until 1936. *Boston* served as a receiving ship on San Francisco Bay. The navy towed her to sea and sunk her in 1946.¹⁴

The deficiencies of the ABCD ships could be blamed on inexperience; naval architects and shipbuilders simply did not know how to design and work with steel. Steel enabled designers to incorporate features that were not possible or cost-effective in iron and wood ships. Technology and knowledge advanced very rapidly during this period and the world's warships rapidly became obsolete within a few years of their construction.

Naval Architects and Education:

Naval architecture made outstanding progress in the last two decades of the nineteenth century. In England Sir William H. White and William Froude made distinguished contributions. David W. Taylor of the United States was the premier naval architect. The responsibility for designing, building and repairing warships

¹³Alden, Steel Navy, 1972, p. 16.

¹⁴The disposition of ships in the "Squadron of Evolution" is detailed in Alden, Steel Navy, 1972, p. 16.

rested with a group of about fifty U.S. Naval officers belonging to the Corps of Naval Constructors.¹⁵ Candidates for the corps came from the top ranked graduating students of the Naval Academy.

The newly commissioned officers received orders assigning them to study advanced naval architecture at the Royal Naval College at Greenwich and the Ecole d'Application du Genie Maritime in Paris. Consequently, U.S. warship design had its roots in European practice. After 1900 candidates for the Navy's construction division attended Massachusetts Institute of Technology and studied under William Hovgaard, a well-known naval architect.¹⁶

Steel and Ship Construction:

The United States could not build a powerful American fleet without an abundant supply of steel. During the 1880s American mills could supply mild steel plating appropriate for building unarmored cruisers, but heavy steel armor plate was unavailable from domestic suppliers. Heavy forgings for engines and guns were beyond the capability of the existing industrial base and had to be ordered from European suppliers.

Steel is primarily an alloy of iron and carbon. Since the mid-1850s domestic manufacturers were producing it in sixty to ninety pound batches. Steelmakers made alloys for large forgings by combining the melts of small batches. For example, a large gun forging made in 1874 required the contents of 584 crucibles. Later, steel plants employed Bessemer converters that produced lots up to twenty tons in twenty minutes. In 1864 William Siemens in England and Pierre Martin in France developed the open hearth process.¹⁷ The open-hearth process allowed steelmakers to control the process closely and manufacture several hundred tons of alloy steel in a batch. The technology enabled the United States to expand into full-scale steel production.

To stimulate the construction of plants and machinery for full-scale steel production, the Navy Department consolidated orders into lots large enough to justify capital investment by private industry. The navy placed a contract for 1,300 tons of gun forgings and 6,700 tons of steel armor plate for four iron-hulled monitors and the second-class battleships Texas and Maine. The Bethlehem

¹⁵Clark, G. S. "Naval Aspects of the Spanish-American War." *Brassey's Naval Annual*. (Portsmouth, New Hampshire, J. Griffin, 1899), 95.

¹⁶Alden, *Steel Navy*, 1972, p. 197.

¹⁷Desmond, *Timetable*, 1986, p. 1864.

Iron Company of Pennsylvania received the contract in 1887. The Navy established Andrew Carnegie's steel companies as a second source of supply. The steelmakers furnished armor plate trimmed to specified size. The Harvey process was developed to give armor plate a case hardened surface with a softer base beneath. Harveyized steel would shatter the point of a projectile, flattening it and impairing its ability to penetrate. The softer steel beneath would absorb energy. By 1891 American industry could supply the navy's requirements.

Civilian yards did most of the warship construction. Prominent builders included William Cramp and Sons of Philadelphia, the Newport News Shipbuilding and Dry Dock Company of Virginia, and the Union Iron Works of San Francisco. These yards could fabricate nearly everything that a warship needed except guns. Large guns came from the Naval Gun Factory in Washington, D.C. The Brooklyn and Norfolk Navy Yards built some ships. While the navy did most of the preliminary engineering, the shipyards delineated most of the detailed construction drawings and completed lofting.

Construction Technology:

To develop the shape of the ship and its plating, modelers first built a large scale wood model of the hull. Loftsmen would produce a table of offsets that gave the ship's scaled-up dimensions at "stations" or locations along the length of the hull. This table of offsets determined the contours of full-size hull lines on the loft floor. Loftsmen then cut wooden shapes or patterns to make full-size templates. Each template conformed to a frame in the hull structure. Skilled workers cut the frames and plating out of steel plate, carefully trimming them to match the template shapes.

Anglesmiths heated the hull angle bars to soften them, then bent the bars in a jig, following the curves of the templates. Laborers using sledge hammers and lever bars forced the red-hot angle bars into the jig.

Workers in the structural steel shops manipulated hull plates through forming rolls that developed the specified curvature. Other trades used press brakes to bend sharp angles in hull plates. Punch presses pierced holes for rivets in the plating and angle frames. Machinists milled the components to precise size.

Shipwrights laid the keel pieces on the shipbuilding ways. Then they set up frames at each station along the keel. Longitudinal members and stringers held the frames in place. Work crews installed inner bottom plates, floors, the protective armor deck, machinery foundations, bulkheads and hull plating. Riveting crews fastened the pieces with thousands of hot rivets manually pounded through matching holes in the plates and frames. Riveters rounded

over the protruding parts of the rivets to expand the shank and form a head. Huge cranes positioned and placed boilers, engines and heavy machinery. Heavy bolts anchored armor belts to the hull.

After a ceremonial launching of a completed hull, tugs towed it to a fitting out pier for installation of the superstructure, military fighting tops and gun turrets. Shipfitters installed the auxiliary machinery. An informal builders trial would be scheduled. Finally a four hour acceptance trial at maximum speed with navy observers aboard, determined if the vessel could meet operating specifications. After acceptance, the navy officially commissioned and manned the new warship.

Characteristics of Steel-hulled Vessels:

Steel warships challenged shipbuilders and the navy with some distinctive problems. While they were not subject to dry rot, rust was a constant threat. In salt water, galvanic corrosion occurred where bronze through-hull fittings contacted the steel hull. Shipbuilders solved the problem by eliminating bronze fittings in contact with steel plating. Sacrificial zinc plates that corroded before the steel and could be replaced easily protected other vital fittings. Barnacles and other marine organisms grew profusely on painted steel hulls. Chemists developed anti-fouling paint formulations that deterred growth. Even with anti-fouling treatment steel ships had to be periodically drydocked to have the growth scraped off.

The British battleship *Camperdown* rammed and sank the battleship *Victoria* in 1893. *Victoria* lacked watertight compartments and doors below decks. To preclude similar catastrophe, designers eliminated bulkhead openings below the waterline. This obstructed free passage through the ship below decks but it increased survivability. Designers also specified construction of cofferdams within the hull. A cofferdam is a partial inner hull extending in a belt around the waterline. Shipwrights sometimes filled cofferdams with cellulose derived from coconut husks or the pith of corncobs. Theoretically, if a projectile penetrated the hull, the cellulose would absorb water and swell, thus sealing holes automatically.

Yet, nearly all ships leak slightly, and some water always permeated the coffer dams. Cellulose swelled, decomposed and formed an environment favorable to rust formation in an area difficult to inspect and maintain. By the turn of the century designers rejected further use of cellulose-filled coffer dams.

The Washington Navy Yard installed a model tow-tank in 1900. This enabled naval architects to experiment and quantify the relative performance of proposed hull shapes. In 1903 the navy started to

standardize auxiliary machinery and components and issued stock plans for ships' boats, hatches, hull fittings and valves.

By 1910 shipbuilding technology reached a plateau. Few changes occurred until arc-welding replaced riveting. A Mr. Wilde invented electric arc-welding in 1865 but it was not until 1919 that the first all welded ship came down the ways.¹⁸

Radical Designs:

As in any rapidly advancing technology there are discoveries and inventions that appear to be sound ideas but later fail to fulfil their promise. The American navy developed two unusual ships during the 1880s. Lieutenant Edmund Zalinski, U.S. Army, invented a gun that fired guncotton-loaded shells. Guncotton, nitrocellulose or dynamite offered destructive force greatly exceeding conventional charges. Unfortunately these explosives could be detonated with a sharp impact. The "dynamite gun" used compressed air to propel projectiles smoothly out of the weapon's bore. It eliminated the explosive impact of conventional propellants on shock-sensitive ammunition. In 1886 Congress appropriated \$350,000 to build a "dynamite-gun cruiser." Cramp's shipyard in Philadelphia fulfilled the contract. Christened *Vesuvius*, the vessel was an early prototype of a "weapons system" in which armament and its delivery system were inseparable.

Vesuvius' top speed was over twenty-one knots. She lacked armor. The vessel's structure supported and fixed the pneumatic tubes used for propelling dynamite shells so that the gunner's aimed by pointing the vessel at the target. Gunners changed range, which varied from five hundred to two thousand yards, by adjusting the duration of the high pressure air blasts used to eject the shell.

Vesuvius was popular with the public but not with the navy. The lack of armor made her a "sitting duck" vulnerable to small caliber fire. She did find use during the bombardment of Santiago, Cuba during the Spanish-American war. During the day she would remain concealed behind the blockading battleships. At night she would lob blindly aimed dynamite projectiles at the Spanish fleet in the harbor. Most of these made awesome craters in the surrounding hills but did little real damage. Naval personnel belittled her popular reputation as a terrible secret weapon and the government planned to convert her to a torpedo boat.¹⁹

¹⁸Desmond, Timetable, 1986, 1919.

¹⁹Alden, Steel Navy, 1972, pp. 47-48.

Another "concept-ship" design reverted to the naval warfare practices of the Roman Empire. The *Kitahdin* was an armored ram designed to cut through any warship afloat. Naval officers questioned the utility of ram type vessels but proponents managed to get Congress to authorize construction.

The *Kitahdin* looked like a submarine and ran with decks awash when in fighting trim. A massive cast-steel stem backed up with large timbers and covered with two to six inches of armor plate formed the ram. The Bath Iron Works launched *Kitahdin* in 1895 but her trial speed of 16.1 knots was one knot short of the contract speed and the Navy could not accept her.

Theoretically, *Kitahdin* could not run at seventeen knots with engines "of any horsepower that could be put in her" according to the Navy board. Congress passed a special bill in 1896 to authorize her acceptance.

Working aboard her was probably the most miserable job in the navy. Ventilation was poor and the interior of the hull dripped condensation incessantly. Below deck temperatures exceeded 110° F. and heat in the boiler room prevented stokers from shoveling coal for more than a few minutes. In moderate seas most of her ports had to be sealed and she ran "half-seas under," according to her commander, George Wilde. Plans called for her to participate in harbor defense during the Spanish-American War. Instead her orders sent her to supplement the blockading fleet off Santiago. She arrived after the American Navy's decisive battle victory there. The navy decommissioned *Kitahdin* and sunk her as a gunnery target in 1909. Her greatest contribution was in developing the technology for building submarines and reinforced bows.

Second Generation Protected Cruisers:

There were two variations of cruiser designs, the protected and the armored. The protected cruiser featured a curved protective deck of armor plate over the ship's vital areas.²⁰ They were also heavily armed for their size carrying medium-caliber, rapid-fire guns mounted singly on the weather deck and in lower deck sponsons. The armored cruiser was heavier and armed with larger guns and carried a belt of side armor in addition to a protective deck.

A mechanical innovation in the *Charleston* was the use of hydraulic steering equipment instead of steam-operated gear, a feature that would become a trademark of Union Iron Works' ships. *Charleston*

²⁰Commander John D. Alden, U.S. Navy (Retired), Olympian Legacy, (Annapolis, Maryland: U.S. Naval Institute Proceedings, September 1976), 63.

displaced 4040 tons. Her design evolved from plans for the Naniwa, a Japanese cruiser designed by Sir W.G. Armstrong, Mitchell and Company of Newcastle-on-Tyne, England.

By 1886 the domestic steel industry and the navy's shipbuilding capability had developed to the point where construction was practicable. The naval appropriations bill of 3 August 1886 authorized construction of two cruisers of 6000 tons displacement. The bill stipulated that domestic machinery and steel had to be used and one ship had to be built in a navy yard. This turned out to be the Texas at 6335 tons, built at Norfolk Navy yard. The Texas, based on a British design, had gunnery problems - the crew could only load when the guns pointed straight ahead or dead abeam because their rammers lay outside the turrets. It took seven minutes to fire a round. Later a gunnery officer designed a telescoping ram that fit inside the turret. This allowed the guns to be loaded despite the degree of train and reduced time to two minutes per round. Texas had other structural problems - her boiler saddles caved in when the boiler was filled and the bed plate of an auxiliary engine broke due to excessive hull flexibility.

The second ship was the Maine at 6682 tons. She fit into neither battleship nor cruiser class. The Brooklyn Navy Yard built Maine. Both the Texas and Maine had their main battery mounted "en echelon" that is, off center to port and starboard. Unfortunately, when fired inboard across the vessel's center line, the muzzle blasts sprung the deck plating badly out of shape. The off center arrangement did not have practical advantage and designers abandoned it.

Significance - The First-Class Protected Cruiser Olympia:

Built as part of the construction program authorized on September 7, 1888, the largest of the new warships was the 5870 ton first-class protected cruiser *Olympia*. She was built to a singular original U.S. design, unlike anything else afloat. She was named after the capital city of the State of Washington, whose citizens, following custom, purchased and donated the ship's formal silver service.

Bids for her construction were called for on April 10, 1890. Two months later the navy placed her construction contract with the Union Iron Works of San Francisco, California. The contract price was \$1,796,000, with an additional bonus of \$50,000 for every quarter-knot in excess of the required average speed of twenty knots per hour for four consecutive hours. Her keel was laid on June 17, 1891 and she was launched on November 5, 1892 with Miss Ann Belle Dickie, daughter of a shipyard official, doing the honors. Fitting out work lagged and she was not commissioned until February 5, 1895. She was built as a flagship, and consequently

featured finely finished cabins and saloons which could serve as suitable meeting rooms for diplomatic events. However, 5-inch guns mounted amidst the varnished brightwork served to remind distinguished visitors of *Olympia's* combat role. Her design called for housing 466 officers and enlisted personnel.

All the materials of construction were made in the United States. The Carbon Iron Company of Pittsburgh, Pennsylvania furnished the hull plating. Steel shapes came from the Midvale Steel Company, a division of the Pacific Rolling Mills of San Francisco. Boiler plate came from Carnegie, Phipps & Company of Pittsburgh, and the shafting from the Bethlehem Iron Company, of Bethlehem, Pennsylvania.

Originally designed to be 334 feet long, the contractor lengthened her by ten feet at their own expense to provide more space in the fire rooms. She is 33 $\frac{1}{2}$ feet deep, her beam is 53 feet and she draws 21 $\frac{1}{2}$ feet. *Olympia* has a cast steel ram in her bow. She has two masts and a schooner rig. The foremast originally had two and the mainmast one military fighting top. These lightly armored barbettes protected gunners who manned gatling guns to repel boarders and for providing covering fire during close-in fighting.

Olympia's design incorporated innovative design refinements tested and evaluated on the ABCD ships and other second generation cruisers. In a unique arrangement for U.S. protected cruisers, a pair of cylindrical armored turrets covered with conical roofs housed *Olympia's* powerful main battery of four 8-inch rifles. Small steam engines rotated her gun turrets. Her straight sided cylindrical turrets, inherited from the Civil War monitors designed by John Ericson, gave her an outdated appearance. Other ships of the period were fitted with balanced high-elevation turrets having a flat sloping faceplate and overhanging gun house.

Earlier classes carried secondary batteries of 6 to 8 inch slow firing guns. *Olympia's* ten new 5-inch rapid-fire guns represented a substantial increase in efficiency over the older guns. She carried several 1- and 6-pounder rapid-fire guns. Her design reflected the invention of the "automobile torpedo" by Robert Whitehead and Giovanni Luppis in 1866. She mounted six eighteen-inch torpedo tubes mounted above water; one in the bow, one in the stern and two amidships, port and starboard.

Gun stations were located to concentrate firepower straight ahead. The torpedo discouraged warships from closing to ram and designers shifted turrets back to the center line, fore and aft, to permit firing over a wide arc from broadside to broadside. *Olympia's* deck layout insured that the batteries could lay down the maximum amount of destructive gunfire against an enemy in any direction. Experience revealed that her torpedoes were not effective and the

tube in the bow was a constant source of leakage. Damage to Spanish cruisers during the Spanish-American War demonstrated that launch tubes located above the water line were susceptible to gunfire. After 1902 most new battleships and cruisers received improved underwater launch tubes.²¹ The navy removed *Olympia's* tubes during the refit of 1902. They were not replaced.

Trolleys conveyed ammunition from *Olympia's* magazines to the hoist entrances. A single ammunition carrier drawn by an electric hoist pulled shells up through an armored tube into the turret. The rope led over sheaves on a jib crane that could swing to service either gun.

Armor and watertight bulkheads guarded the vessel against contemporary projectiles. An armored protective deck shielded the engine, boilers and magazines against plunging fire from shore-based weapons. Her armored protective deck joins the hull below the water line at an angle of 30°. This armor is 4 ³/₄ inches thick amidships, 3 inches thick fore and aft and 2 inches thick on the flat central area which is above the water line. Ammunition tubes for carrying shells and powder from the magazines to the guns are protected with 3 inches of armor.

A coffer dam, essentially an inner hull, formed a secondary water barrier above and below the water line. The coffer dam contained treated corn cobs which, in theory, would swell when wet and seal hull breaches or holes. The crew found that normal leakage into the coffer dam caused the cellulose to rot and smell. The navy authorized its removal early in *Olympia's* career.

A cellular structure of compartmentalized coal bunkers supplemented the armor protective deck. Presumably the force of a detonating shell would be absorbed within the coal. *Olympia's* designers minimized the number of hull openings to enhance watertight integrity. The only guns below the main deck were several 6-pounders in unobtrusive sponsons. Her water tight compartments could be sealed off to isolate damaged sections of the ship. Her ability to survive battle damage depended on the layout and position of armor, armament, machinery, coal and stores.

Many important developments during the mid-nineteenth century contributed to the advancement of marine power plant design. The *S.S. Brandon* had the first compound marine engine. John Elder & Company built it in 1854.²² The first triple expansion engine was

²¹Alden, Steel Navy, 1972, p. 208.

²²Desmond, Timetable, 1986, p. 1854.

installed in the *S.S. Propontis Clyde*, a British merchant ship in 1874.²³

Engines used for marine propulsion were either compound, triple expansion or quadruple expansion. By the late nineteenth century the triple expansion was common.²⁴ Multi-expansion engines lost less efficiency through cylinder condensation, exerted a more even turning moment on the shaft and generally weighed less and had less internal friction per horsepower generated than single expansion engines.

Detailed as-built specifications of *Olympia's* hull, engines, boilers and auxiliary equipment are included in Appendix A. *Olympia's* two modern twin-screw vertical triple-expansion engines were rated at 13,500 hp. at 160 lbs. pressure and 128 rpm. Their cylinder diameters are 42, 59 and 92 inches with a 42 inch stroke. The main valves are of the piston type, worked by the Stevenson link motion. The design specified bronze bed plates and journals lined with Parson's white metal installed under hydraulic pressure of 15 tons per square inch.²⁵

ENGINE DATA

Number of cylinders, each engine	3
Diameter of cylinders, high pressure, inches	42
Diameter of cylinders, intermediate pressure, inches	59
Diameter of cylinders, low pressure, inches	92
Ratio of piston rods, inches	1.0; 1.973; 4.798
Stroke, inches	42
Length of connecting rod between centers, inches	84
Volume swept by L.P. piston, cubic feet	161.574
Diameter of H.P. valve, one for each engine, top	18.5
	bottom 17.5
Diameter of I.P. valve, two for each engine, inches	23
Diameter of L.P. valve, four for each engine, inches	21

²³Desmond, Timetable, 1986, pp. 1854 and 1874.

²⁴A contemporary source of detailed information on marine engines was found at the Mystic Seaport Library in Mystic, Connecticut. See Sine Loco; Sine Nomine, Engines and Boilers (ca. 1900), 9.

²⁵A detailed engineering report of the *Olympia's* performance under extreme conditions is contained in R.E. Carney, U.S. Navy, Assistant Engineer, "Contract Trial of the *Olympia*," Journal of the American Society of Naval Engineers, (sine loco: May 1894, Volume VI, Number 2).

Olympia's design specified six boilers; four double ended models, 15 feet 3 inches in diameter by 21 feet 3 inches long and two single ended units having the same diameter by 11 feet long. A forced draft system which fed air to the boilers through a pressurized airtight fire room increased efficiency.²⁶ The two single ended boilers provided sufficient energy to generate power and steam when not under way.

During sea trials the engines generated over 17,300 horsepower to achieve a speed of 21.7 knots. This was higher than any previously authorized U.S. protected cruiser and earned her builders a bonus of \$300,000. She could cruise over six thousand miles on fully loaded coal bunkers. Her hull shape reflected the contemporary design parameters based on hydrodynamic tank testing.

Olympia carried a modern electric plant based on the equipment proven in service on the "ABCD" ships. Four individual plants were powered by compound direct acting inverted cylinder engines. Specifications indicate the engines had cylinder diameters of 7 and 12 inches in diameter with a stroke of 6 inches. The 16 kw marine dynamos had their armatures directly connected to the crankshaft. General Electric Company, the manufacturer, designed a machine with four poles projecting inwardly from an octagonal frame. Running at 400 rpm, the units produced 80 volts of direct current at 400 amperes. Gongs, bells, buzzers and annunciators for fire and water alarms were powered by batteries of Leclanche' cells, a non-rechargeable dry cell invented in 1868. Power for the search lights which drew 100 amps at 47 volts, came through a set of voltage dropping resistors in the dynamo room.

Two large steam driven blowers located in the after end of the crew space on the berth deck powered *Olympia's* ventilation system. They pumped fresh air to all parts of the ship. Small steam engines did a variety of hoisting and hauling tasks and reduced the need for manual labor.

Olympia's main purpose was to serve as a platform for weaponry. Her original armament had four 8-inch/35 caliber breech loading-rifles in two turrets on the main deck forward and aft. She also had ten 5-inch/40 caliber rapid-fire guns mounted individually in casemates located around a twelve-sided citadel located amidships on the main

²⁶The first airtight fire-room that worked satisfactorily was on the steamboat *John Stevens*, built at Hoboken, New Jersey by the Stevens' firm about 1847. They were preferred on first-class vessels used on the Great Lakes during the mid-eighteenth century. See F.T. Bowles, "Cruisers," 1883, p. 595.

deck. There were 14 six-pounder quick-firing rifles in small sponsons on the berth deck and in shielded open mounts in the superstructure plus six 1-pounders, four Gatling machine guns in her two military fighting tops and six 18-Whitehead torpedo tubes mounted above the water line.²⁷

The *Olympia* was the realization of a generation of improved steel ship design. It was one of those rare designs in which the sum of the whole was greater than that of the component parts. *Olympia's* design achieved a successful balance of armament, protection, speed and endurance. The *Columbia* and *Minneapolis* expanded and incorporated *Olympia's* features. *Columbia* was designed as a commerce raider and was the second vessel in the navy to have three engines and triple screws. Unfortunately, the expanded versions needed larger engines in slightly larger hulls. This reduced bunker space and operating range. Firemen could not work in the inadequately ventilated boiler rooms on the *Columbia* and *Minneapolis* for regular shift lengths.

Another adaptation of *Olympia's* design led to the *New York*, a vessel that borrowed some features from French warship designs. The *New York* had belts of armor plate along her sides and an internal protective deck.²⁸

***Olympia's* Refit of 1902:**

Advances in the technology of warship design persuaded the navy to upgrade the *Olympia* at the Boston Navy Yard in 1902. Improved crew quarters, electrically operated gun turrets and better coal and ammunition handling equipment improved her efficiency. Other changes increased ventilation and improved the ship's heating systems. The refit enhanced her efficiency as a fighting machine.²⁹

During the 1890s ships built by the principal navies of the world during the preceding decade were similar. Dimensions, watertight compartments, placement of armor, armament and machinery were comparable. Builders had leeway in fitting out vessels and this produced differences among ships in operational efficiency, ease of maintenance and inspection. These differences and reliability of

²⁷Alden, *Olympian Legacy*, 1976, pp. 63-66.

²⁸Alden, *Steel Navy*, 1972, pp. 55-65.

²⁹A technical engineering report of the modifications made on *Olympia* was written by William P. Robert, Naval Constructor, U.S.N., in "Repairs and Alterations to the U.S.S. *Olympia*," *Marine Engineering* Vol. 7, No. 4, (April 1902), 153.

support systems such as ammunition handling or coal transfer affected operational efficiency.

A lack of common standards for components and systems complicated maintenance and repair. Large and diverse supply inventories had to be maintained. The navy planned to overhaul vessels and eliminate or reduce differences between ships. The following material on *Olympia's* refit of 1902 was abstracted from William P. Robert's article of 1902, "Repairs and Alterations to the U.S.S. *Olympia*," in Marine Engineering.

Ammunition Handling and Turret Drive:

The designers replaced the original wire hoists that drew ammunition to the turrets. The new hoist had two carriers suspended from either end of a wire rope hanging over sheaves in the top of the turret. An electric gearmotor located in the port side of the turret propelled the carriers up to the turret and down to the magazines. As the motor hoisted one carrier the other went down. Automatic limit switches stopped a carrier when it reached the upper end of the ammunition tube. Gunners removed ammunition from the carrier and placed it on a table that pivoted into loading position for either gun.

The small steam engines originally used to rotate the turrets were unsatisfactory. Gunners could not easily control rotation to train the guns accurately. Successful turret drive experiments on the *Kearsarge* and *Kentucky* proved out the idea and equipment for electric power. The engineers specified electric drives for *Olympia's* turrets. The installation improved the speed, control and accuracy for training the guns.

The refit plan specified two 25 hp. driving motors for each turret. Motors drove a worm gear that directly rotated the central tube or column of the turret. Two worm gear shafts cross connected with miter gears mechanically synchronized the motors. The redundant design assured that if one motor failed the other could continue rotating the turret. Controls allowed nine speeds of turret rotation up to 6 1/2 degrees per second. A detent automatically forced the controller to the off position when the turret got to its limit of train on either side. Electric drive improved the effectiveness of the turret-mounted guns.

Improved Crew Quarters-Asbestos Insulation:

Olympia's original designers concentrated on mechanical components. Crew comfort was not a top priority and living spaces in warships were uncomfortable. Nevertheless, the United States Navy paid more attention to high morale and crew comfort than did any other nation. Top Naval "brass" knew that it was as important to keep men

well rested, fit and in good mental and physical health as it was to keep the machinery in repair and operational. As cramped as living space was on a warship, it did not have to be uncomfortable if it did not hamper operations. Part of the refit of 1902 improved the livability of *Olympia*.

The old wooden warships had hulls built up of thick oak planks that insulated against heat and cold. Modern steel hulls quickly transmitted every external temperature change to crews. Men sweated in tropical heat or froze in northern latitudes. When temperatures reached the dew point the cooler hulls condensed moisture and "sweated." The puddles of water that formed made life aboard *Olympia* wet and unpleasant.

Designers addressed this problem in the ABCD ships by applying wood sheathing to the inner surface of the frame angles in officers' quarters. This created an air space between the hull and the outer wall of the cabins. In crew spaces thin sheet iron sheathing performed the same function. The dead air space between the hull and sheathing was ineffective in solving the problem. Convection and radiation continued to transmit outside temperatures.

The designers, unaware of its hazardous properties, used asbestos to sheath the sides of the living spaces. In view of current data on asbestos-related disease, turn-of-the-century perspectives on asbestos and its installation are of interest. William Robert's report of the *Olympia's* alterations describes its application:

In refitting certain ships of our Navy, and in the construction of certain new vessels, asbestos lining has been largely used for sheathing the sides of living spaces. The results have been very satisfactory, a more even temperature being maintained in this way than by any of the former methods. Apart from the nonconducting properties of asbestos, it commends itself for use on warships on account of its fireproof and non-splintering qualities.

In the case of the *Olympia*, asbestos has been used in the officers' living spaces, and its use has also been extended to certain other spaces where it is particularly applicable; notably in the engine and boiler room trunks, and on the under side of the beams that support the deck of the dynamo room, magazines being located under this room. All sides of the midships magazine were also sheathed with asbestos, and the airspace thus provided was fitted with special supply and exhaust pipes connected with the ventilating blowers to ensure a frequent change of air and consequent reduced temperature.

The method of fitting this asbestos sheathing against the sides of vessels consists of a wire netting, secured to a

framework of small angles. On this netting are fitted sheets of asbestos firefelt, 1 ¹/₂ inches in thickness, being held against the screen by means of washers secured to the netting by wire. Against this surface of asbestos firefelt are fitted sheets of asbestos millboard, ⁵/₈ inch in thickness, the seams of which are covered with strips of steel molding, the latter being secured by means of bolts previously fitted in place through the small angles forming the framework. The nuts on these bolts are countersunk and rounded and the sheathing, thus finished, presents a neat appearance of panel work.

In fitting this sheathing in other than living spaces, the millboard is omitted and its place supplied by galvanized sheet iron, through bolts with common nuts being used to secure the sheets to the angle iron structure. This method is simpler, and less expensive, than that used in the living quarter.

Coaling and Winches:

The *Olympia* rarely used her sails. Her top speed depended on the endurance of the firemen and the efficiency of transferring coal from bunkers to the boiler rooms. Coal transport was a critical function. *Olympia's* designers compartmentalized her coal bunkers into watertight cubicles that could be sealed off to isolate damage. The design made transport from distant compartments to the boiler room difficult. For *Olympia's* refit the designers ran an overhead trolley in the wing passage on each side over the length of the upper bunkers. Coal handlers could transfer fuel from upper bunkers to the scuttle over any lower bunker on the same side of the vessel.

In *Olympia's* original design all coal had to be loaded aboard through hinged chutes or "cheese ports" that penetrated the upper hull. The refit provided four special coal trolleys, located above the superstructure deck and arranged to clear all machinery. Each trolley carriage ran on athwartship I-beam crane with a base located near the center line of the ship. The outer end curved down and in operation extended about five feet over the side of the vessel. A large "A" frame supported the beam near the outer end. The whole apparatus could be pulled inboard and carried clear of the ship's side when under way.

The coal handlers moved the fuel from a dock, collier or lighter to the ship using large canvas bags. The filled bags were hoisted with a wire rope hanging from the I-beam crane. The wire ran from the tip of the I-beam inboard to a winch. The coal handler engaged a

friction coupling on the winch to raise the coal bag. The coal handler controlled speed with a foot operated friction band. When clear of the superstructure deck, the handler brought the bag inboard and then lowered through a large square opening in the deck. Deck openings extended through the superstructure and gun decks. Small wheeled carts transported coal bags to the various scuttles over the bunkers.

The winches operated continuously and never reversed. Gravity dropped the bags with speed controlled by friction. The old "cheese port" system stayed in place and could be used simultaneously or independently.

The designers added two new winches on the superstructure deck. "Gypsys" on the end of each winch hoisted boats and other heavy weights. The winch drums used for hauling bags of coal were inboard of the gypsys. Each winch could handle *Olympia's* heaviest boat, her 33 foot steam launch.

Ventilation:

The original centralized ventilation system was inefficient and inadequate. Steam lines running through crew spaces to power the blowers were hazardous. Placement of the blowers required long runs of large cross-section piping throughout the ship to deliver the necessary volume. It was not very efficient. Ducts penetrated many watertight bulkheads and reduced the watertight integrity of the vessel.

The engineers completely remodeled *Olympia's* artificial ventilation system specifying the addition of nine electrically driven blowers, as follows:

Two blowers supplied fresh air to the dynamo room and to the magazines located below.

Two exhaust blowers on the platform deck over the dynamo room removed foul air from the dynamo room and from the various compartments on the forward berth deck, forward platform deck and the storerooms forward.

Two blowers on the after berth deck supplied fresh air to the main crew space, the junior officers' and warrant officers' quarters.

These also ventilated the various pantries, closets, bath rooms and washrooms on the berth deck as far aft as the wardroom messroom, the distiller room, funnel rooms and midships magazine.

Two blowers on the after platform deck supplied fresh air to the wardroom, staterooms and bathrooms. These also supplied fresh air to the after storerooms, magazines, tiller room and other compartments under the wardroom.

One blower was located under the after end of the dynamo room, and exhausted hot and foul air from the forward magazines. These magazines posed a special problem because of their location near the boiler and dynamo rooms.

The designers provided additional trunks and cowls to supply fresh air and exhaust foul air. Steam powered blowers provided for ventilation and forced draft in the boiler rooms. The engine rooms had intake trunks with cowls for supplying fresh air. Hot air from the engine rooms exhausted through the main engine room hatches and other trunks.

New piping supplied the coal bunkers with fresh air through trunks that ended at the hammock berthing on each side of the superstructure. Branches off these trunks ventilated each bunker. Separate piping exhausted hot air generated in the bunkers through the main funnel hatch.

Fire Suppression System:

The designers replaced and extended the water main for fire fighting. They installed the new main under the armor of the protective deck. Shipfitters refurbished a second main under the upper deck. Risers connected the two systems. Two main fire pumps, one in each engine room outboard next to a seacock, pressurized the fire suppression system. Four auxiliary fire and feed pumps in the boiler rooms and three hand deck pumps backed up the main pumps. Any portion of the fire suppression supply piping could be isolated with gate valves if battle damage occurred. The designers provided 30 hydrant connections for fire hose. Other connections linked the fire suppression system to the distilling plant and flushing water main. Engineers specified copper piping with an inside coating of black Sabin enamel for the fire suppression system. This material was resistant to corrosion from salt water.

Radio:

In 1903 Slaby-Arco wireless telegraphy equipment was installed in U.S. warships.³⁰ *Olympia's* was housed in a 17 by 11 foot radio "shack" mounted on the after bridge just aft of the mizzen mast. The roof of the shack served as a platform for a range finder and compass.

³⁰Alden, Steel Navy, 1972, p. 235.

Shipboard Life:

The *Olympia* published a ship's newspaper called the Bounding Billow. While the articles are anecdotal and frequently reflective of the prejudices and stereotypes of the period, the journal gives a first-hand portrait of life aboard the *Olympia* from the enlisted man's point of view. Publication started on November 30, 1897, about two years after commissioning the vessel. The following selections and excerpts from the Bounding Billow were authored by the ship's writer, Mr. L. S. Young:

In Yokohama: Here we became acquainted with the whole souled, big hearted (?) Tommy Matsu, comprador. Oh! he "long time sabe 'Merican man-o'-war." And he did without a doubt. He brought off eggs that must have been laid before the war and saved especially for us; juicy steaks from the water-buffalo, i.e. the shoemakers made fine sea boots from it, but it was cheaper to buy it in the rough; and last but not least those chickens that must have perched on the roof of Noah's ark and acted as a primitive alarm clock for "his nibs" the landlord.

Tokio is the capital and is a delightful place (for Japan) to visit. There are many things of interest to be seen, chief are the various old temples and the Emperor's Palace which is surrounded by spacious grounds, deep moats and lofty walls. At the entrance to the palace are stationed a body-guard of foot-soldiers in blue coats and bright scarlet trousers. Another place of interest is the famous Uyeno Park which contains a well equipped menagerie, library, museums of natural history, beautiful gardens and driveways.

A great many of the crew attended the performance at the various native theaters on the avenue known as Theatre Street. The price of admission for Japanese is two or three sen, but for "Jack" it is all they can get, many of the greenest paying two or three dollars to see about as bum a show as was ever forced upon the suffering public.

For the 4th of July (the crew) built "Trevorrow Falls," an artificial waterfall built amidships and surrounded by trees and flags. There were floral reproductions of "1776", "1897" and the Liberty Bell. During the celebration some fireworks misfired and set fire to the display but the crew managed to get things under control before much damage was done.

During the 4th of July celebration the ship held a "greasy pole" contest and track and field events including a game called "Thread the Needle." The crew organized boxing bouts, a Japanese sword fighting demonstration and a pie eating contest.

On the 29th of July, 1897, Captain Read left and Captain Gridley took command. Normally, this was an occasion for performing a naval custom called "Whitewashing the Books." The practice called for all hands to be promoted to first class with the changing of command. The Billow records with dismay that Gridley went against tradition and did not promote anyone.

Several deaths and serious injuries had the crew fearing that they were assigned to a jinxed ship. On the 11th of August, 1897, a marine committed suicide. On the 5th of September an apprentice fell into the engine room and died of internal injuries. A fire ensign got his leg crushed in the anchor chain and it had to be amputated. Immediately after rowing ashore, apprentice seaman Frank Epps was murdered by native thugs while still in sight of his shipmates. Coxwain Johnson was killed when a gun plunged off its mount and pinned him against a bulkhead. A board of inquiry found that the gun's hydraulic recoil cylinder was not filled with oil; it had appeared full but the fill tube was blocked. Bandsman Deluca died of unknown causes and a Captain-of-the-after-guard was asphyxiated by a gas leak in his hotel room while on leave in Yokohama. The series of deaths depressed morale and started stories circulating about the *Olympia* being a "hoodoo" ship.

Sometime in November 1897, *Olympia* arrived in Japan for coaling. Coaling was a hated activity, although the officers attempted to make a contest of it by awarding prizes for the fastest squad. Whenever possible, hired local civilian labor performed the task. In Nagasaki, *Olympia* employed women aged from 10 years up to keep a steady stream of coal flowing into the bunkers. The women received 20 sen for a day's work. Women were preferred as they worked harder than men. The Billow's editor, comparing hard-working Japanese against the nascent liberated American woman, commented:

The women all over Japan are supposed to do as much work as a man, outside their duties as house-wives. Verily Japan is the place for the [American] "new woman" and if a year's experience here don't knock the foolishness out of her, she should be made Emperor of Patagonia or janitor of a Harlem flat.

The *Olympia* ventured a high speed run in high seas. She reached 22 knots battling 30 foot seas. The waves broke glass in the pilot house, damaged the bridge railings and wrecked the engine room telegraph on the bridge. Her crew was justly proud of her high speed performance in such extreme conditions. Ship's custom called

for passing other ships at high speed. Her crew delighted in "showing her stern" to other ships. One such episode was reported in the Billow when she was being overtaken by *Empress of India*, queen of the British liners in the far east. *Olympia's* crew anticipated an order to lay on the coal and show the *Empress'* passengers what she could do. The Captain declined to race and the order never came. The passenger liner cruised by at a stately 16 knots while the deck crew of the *Olympia* looked on in frustration. Considering the pride the crew had in their ship, the Billow expressed their disappointment in very restrained terms.

Much of the recreation aboard was oriented toward physical fitness; entertainment often had a physical component. Activities included boxing, club swinging, dancing and boat racing. *Olympia's* chief rival in boat racing was the *Charleston*. Winners of boat races were awarded money prizes depending on the class of boat:

	Oars	distance	1st	2nd
Barges	12	2 miles	\$26	\$13
Cutters	10	2	26	13
Cutters	10	2	22	11
Gigs	6	2	14	7
Dinghys	4	2	10	6

A comic race involving catamarans (floating, two-hulled work platforms) paddled with coal shovels over a $\frac{1}{4}$ mile course, was also popular. The catamaran racers earned a first prize of \$12 or a second prize of \$6.

The tug-of-war was popular and each ship had an organized team. Pie eating contests were common. Although the pies always looked delicious, they were often filled with cut up old socks, sawdust, potato skins and orange peel.

The crew enjoyed musical entertainment. These ranged from ceremonial band concerts to impromptu choral singing and musical performances. A popular musical group led by "Chips", the ship's carpenter, included guitars, mandolins and violins.

On December 23, 1897 the ship's company gave an entertainment ashore for the benefit of Nagasaki charities. The "*Olympia's* Minstrels" donned blackface and the "one night stand was a howling success."

The diet aboard ships of the US Navy at the turn of the century would put weight on sailors who were not involved in heavy physical work. Holidays were celebrated with extra rations. Thanksgiving always featured turkey and mince pies. The Executive officer's Handbook, which contains the information needed for operating the

vessel, gives the list of rations to be fed to each man aboard:³¹

Daily Rations per Man

Hard bread	14 ounces	Beans	1/2 pint
Preserved meat	12	Peas	1/2 pint
or Fresh beef	20	Sugar	4
or Canned ham	12	Canned vegetables	6
or Sausage	12	Fresh vegetables	20
or Salt pork	16	Fresh Bread	16
or Salt beef	16	Molasses	1/2 pint/wk
Butter	2	Vinegar	1/2 pint/wk
Tomatoes	6	Pickles	4 oz/week
Dried fruit	2	Coffee	2 oz/day
Rice	8	Tea	1/2 oz/day
Flour	8		

The crew was divided up into groups of about twenty-four men who would appoint one of their own, usually someone "too small to haul ammunition and too dumb to do anything else," as cook for the group. In addition to ship's rations, an allowance of ten cents per man per day was given to the group cook. This was to be used to purchase fresh vegetables, condiments and supplements when in port. Sometimes the cook would gamble the money away or spend it on a drinking binge, incurring the wrath of his mess-mates and condemning them to a monotonous diet for the rest of the month. Usually the cook would take a thrashing in the bargain. The navy abolished this mess system prior to World War I.

Appendix B details shipboard routine in the United States Navy at the turn of the century. Additional excerpts from the Bounding Billow describing the Battle of Manila Bay are included in Appendix C.

Photographs of Shipboard Life and Activities:

There is an excellent photographic record of shipboard life aboard the *Olympia*. In 1899, Theodore Roosevelt arranged to have Francis

³¹A valuable booklet that describes detailed operations aboard the *Olympia* was assembled by the ship's Captain. It contains essential information pertaining to the day-to-day running of the vessel and the supervision of its crew. For detailed information on ship procedures see John J. Read, Captain U.S.N., Handbook of the U.S.S. Olympia Executive Officer, (Hong Kong: Kelly & Walsh Limited, 1897). (Rare book located at the Naval History Center, Washington Navy Yard, Washington D.C.)

Benjamin Johnston, a well-known photographer, assigned to document activities aboard the *Olympia*. Roosevelt introduced Johnston to Dewey with a short note inscribed on her calling card:

My dear Admiral Dewey - Miss Johnston is a lady, and, (about) whom I personally know. I can vouch for, she does good work, and any promise she makes she will keep. Theodore Roosevelt.

Appendix D details Johnston's work, most of which is preserved on 5 x 7" glass plates archived at the Library of Congress.

Olympia in Battle

Olympia's fame rests on her performance, along with the rest of Dewey's fleet, at the Battle of Manila Bay. George Dewey assumed command of the *Olympia* on January 3, 1898 at Hong Kong. British naval officers stationed at Hong Kong believed that the Americans were doomed to destruction. They gave the Yankees little chance of victory over Admiral Montojo's squadron at Manila. As one Briton lamented, "a fine set of fellows, but unhappily we shall never see them again."³²

Dewey's orders were to strike at the Spanish fleet at Manila, blockade and if possible, take Manila on the outbreak of hostilities with Spain. Dewey's squadron included the *Olympia*, *Baltimore*, *Raleigh*, *Boston*, *Concord*, *Petrel* and the revenue cutter *McCulloch*. Dewey had also arranged for two supply ships, the *Zafiro* and the *Nanshan*, to carry ammunition and coal to the fighting squadron. These vessels outclassed the larger Spanish fleet which was older and in need of maintenance. However, the Spanish coastal defense guns were modern and well placed to defend the harbor. Intelligence reports indicated that mines (torpedoes) protected the anchorage and could pose substantial risk to the American task force.³³

Dewey seized the initiative, brilliantly performed his instructions with great energy and decisively won the battle, becoming a

³²Robert G. Albion, Five Centuries of Famous Ships - From the Santa Maria to the Glomar Explorer, (New York: McGraw-Hill Book Company, 1978), 291.

³³The official ship's newspaper on the *Olympia* is a worthwhile source of opinion and factual events aboard the vessel. Its style is breezy, conversational and irreverent. For insight into what *Olympia's* crew was thinking and feeling, read L.S. Young, "The Battle of Manila Bay." The Bounding Billow Vol. I, No. 5 (June 1898). Bound copies of the document are available at the Naval Historical Center, Washington, D.C.

national hero as a result. The Spanish fleet fired their first shot from the *Reina Christina* at 5:38 AM on May 1, 1898. Dewey's inspiring words, "You may fire when you are ready, Gridley," joined "Don't give up the ship," and "Damn the torpedoes! - Full speed ahead!" as rousing battle cries.³⁴ Gridley opened fire at 5:41 AM at a distance of 5000 yards and Dewey's fleet decimated the Spanish fleet over the next several hours.³⁵ Dewey did not lose a single man in battle while the Spanish lost seven major ships with 381 killed and wounded out of a force of 1800 men.

One little known factor that contributed to the Spanish defeat was the presence of numerous untrained civilians among Manila's defenders. On the declaration of war, the Governor-General of the Philippines, Basilio Augustin y Davila, issued a proclamation, a call to arms, which inspired many civilians to augment the regular military forces defending Manila.³⁶ This untrained militia probably got in the way of the government forces and contributed to the confusion of battle and the subsequent Spanish defeat.

The official Spanish losses included 167 killed and 214 wounded. The Americans had no one killed in action with several men suffering superficial wounds. An engineer died of a heart attack the night before the battle.³⁷

³⁴The primary source of Admiral Dewey's famous words is a letter in which Admiral Dewey reported the incident to the Secretary of the Navy on September 18, 1903, as follows: "I said, as I remember it, to Captain Gridley, with whom I was on such terms of intimate acquaintance that I rarely addressed him by his title, 'You may fire when you are ready, Gridley.' I did not say this in the usual tone of a military order, but merely as a part of the conversation which we were carrying on. Captain Gridley immediately took his station in the conning tower and gave the order to begin the action, and the other vessels followed as directed."

³⁵Department of the Navy, Office of Information, Internal News Release -- 208-58, (Washington, D.C., Internal Relations Division), 2.

³⁶The Bounding Billow reported, "One of the wounded from the *Reina Cristina* could speak very good English, having been in America some time, but on returning to his native land on a visit had been impressed into the service. He had both legs shot away;- He stated that nearly all the vessels had double crews, many of them being volunteers from among the citizens and that the number of deaths would never be known."

³⁷Albion, Famous Ships, 1978, p. 291.

Admiral Montgomery M. Taylor, who was an ensign serving under Dewey at Manila bay reported that after the battle, every boat from home brought Dewey presents from home such as clothing, specially made boots, a barrel of hams and even a broom. Each member of the crew drew prize money for actions in capturing enemy ships, some of which were expropriated for service in the American navy. Taylor's prize share was between \$300 and \$400.³⁸

L.S. Young's account of the battle as printed in the Bounding Billow, is reprinted in this report as Appendix C. Excerpts from *Olympia's* logbooks detailing her chronology and assignments are included in Appendix E. *Olympia* was in need of overhaul and upgrading after her service in the Philippines. She had a general refit between 1899 and 1902 at the Boston Navy Yard. She was then assigned as flagship of the Caribbean Division of the Atlantic Squadron. For four years she displayed the flag and protected American interests in Panama, Tangiers, Smyrna and the Dominican Republic. In 1912 she was reduced to the role of a barracks ship at Charleston, South Carolina. Just prior to World War I she was rearmed with 12 4-inch/40 caliber guns and assigned to patrol duty off New York. After running aground in Long Island Sound, she was repaired and rearmed with new 10 5-inch/51 caliber guns at the Brooklyn Navy Yard.³⁹

A lesser known assignment for *Olympia* was her secret mission to Murmansk during World War I. By March of 1917 the stress of war with Germany disastrously weakened the government of Tsar Nicholas II. Russia was entangled in a civil unrest which had forced her Tsar to withdraw his forces from the allied coalition fighting Germany. Conservatives, liberals, socialists, commercial interests and elements of the nobility plotted Nicholas' overthrow. Principal among the several factions fighting for control were Bolshevik revolutionaries led by Lenin and Trotsky. In October of 1917 the Bolsheviks gained political control and on November 7th they seized control of strategic points in Petrograd and arrested the provisional government. The new Soviet government under Lenin signed the Treaty of Brest-Litovsk on March 3, 1918, essentially surrendering to Germany and conceding territory for peace. However, a majority of the Russians wanted to fight on against Germany, regardless of how hopeless the cause. This coalition of Anti-Bolshevik forces, including the White Russian army, assisted by British, French and American forces, attacked the new Soviet republic, plunging Russia into a ruthless civil war. *Olympia* supported the American military efforts on behalf of the anti-

³⁸New York Times (New York) August 8, 1958.

³⁹Alden, Olympian Legacy, 1976, p. 66.

Bolshevik forces composed of White Russian and pro-royalist elements.⁴⁰

The mission started when she sailed from Charleston on April 28, 1918 for Scapa Flow off Kirkwall, Orkney Islands, where she coaled ship. Before departing the Orkneys, Brigadier General Frederick Poole of the British Army and his staff boarded. General Poole's specific task was to attempt to recover some of the Tsar's Russian Army manpower for the allied cause.

Murmansk was the terminal of a railroad to St. Petersburg and was the only harbor in Northern Russia that did not normally ice over in winter. During the war the allies had unloaded two million tons of supplies here in support of the Tsar's army. Intelligence sources indicated that a German army was advancing through Finland to cut the vital rail line and capture Murmansk. *Olympia's* mission was to keep the rail line and port in allied hands.

The situation in Murmansk was confused. Refugees crowded the port. The Bolsheviks were not unified and several factions competed for dominance. Supporters of various coalitions, allied troops and agent provocateurs filled the city. Allied forces at Murmansk were nominally under the command of Rear-Admiral Thomas W. Kemp, Royal Navy, who flew his flag in the *HMS Glory*. The French cruiser *Amiral Aube* and the Russian battleship *Chesma* and cruiser *Askold* were also on hand. The Russian ships were commanded by mutineers, pro-Bolshevik enlisted men who had killed most of their officers. It was not known if they would take arms against the allied force sent to protect the port.

Several companies of British marines arrived in the *HMS Porto* to reinforce the allies. On June 8 the *Olympia's* landing force of one hundred men and eight officers landed and joined forces with the British marines to defend Murmansk. Relations with the pro-Bolshevik sailors were cordial at first but by July 12th a bombing incident attributed to Bolshevik sailors almost killed a Russian captain. The military commanders decided to confine the Bolshevik sailors to their vessels. The *Olympia's* men were detailed to keep the *Askold's* mutineers on their ship. On two occasions, the *Olympia's* landing force fired on boats leaving the *Askold*, driving them back to their ship. The sailors aboard the *Askold* and *Chesma* finally surrendered on June 21st and were marched off to a prisoner-of-war camp.

⁴⁰For a first-person account of *Olympia's* assignment during the early days of the Revolution in Russia see Lieutenant Chester V. Jackson, U.S. Navy (Retired), Mission to Murmansk, (Annapolis, Maryland: U.S. Naval Institute Proceedings, February 1969), 83.

Towards the end of July some of *Olympia's* men joined an expeditionary force of French, Serbian, White Russian and British troops. This detachment landed at Archangel on August 2 and cleared the city of Bolshevik troops. Dewey Persche became the first of *Olympia's* sailors wounded in action during the engagement.

Several of *Olympia's* officers, petty officers and enlisted men were detached for duty on the Russian torpedo boat *Beschumni*. They served with White Russians on escort duty until August 8th, when a French crew took over the vessel.

The men who had cleared Archangel of Bolsheviks returned to *Olympia* on August 15th, having been replaced by 4600 fresh troops from a Wisconsin training camp. The forces provided were totally inadequate to seriously support a contemplated White Russian counter-revolution. The American ambassador estimated that 100,000 troops would be needed to bolster the White Russian army and win President Wilson's "undeclared war." There was no political support for a significant American intervention in the internal affairs of Russia; withdrawal was clearly expected.

Olympia left Archangel on November 8th and coaled at Murmansk on the 11th of November. About five o'clock the ship received word of the signing of the Armistice which ended World War I. There was no celebration on board. The six month campaign by the first American man-of-war to land armed Americans in European Russia was over and *Olympia* sailed to Portsmouth, England for repairs.⁴¹

After leaving drydock on December 26, 1918, *Olympia* steamed to the Mediterranean and participated in several peace keeping missions, maintaining an American presence during the post-Armistice period.⁴²

Her primary mission was to supervise the armistice terms in the Austro-Hungarian territory that became Yugoslavia and later Bosnia and Serbia. In Yugoslavia the armistice line extended inland from Cape Flanka on the Dalmatian Coast. The area south and east of the line was occupied by Serbian troops while the Italian Army held the territory to the north and west. Under the armistice agreement the American Navy was to take custody of all Austrian-Hungarian vessels off the coast controlled by the Serbs. Rear Admiral Harry S. Knapp,

⁴¹Jackson, Mission to Murmansk, 1969, pp. 86-89.

⁴²A chronology of *Olympia's* history based on her logbooks may be found in a document from the Department of Defense, United States Navy, "Official History of the U.S.S. *Olympia*," located at the Navy Ships History Center, Washington Navy Yard, Washington D.C.

commander, U.S. Naval Forces Operating in European Waters, reported that the United States had no troops ashore but exerted a "strong moral influence for the preservation of order and avoidance of clash between Italian and Yugoslavs."

There was considerable friction between the Italians and the Yugoslavs along the armistice line which was kept under control by the tactful firmness of the American Navy. On September 23, 1919 the *Olympia* received information that three truckloads of Italian soldiers under the command of a army captain had crossed the armistice line and captured the Serbian garrison at Trau. A serious confrontation between the Italians and the Serbian Military Authorities appeared to be inevitable. Captain Boyd, the senior American officer present, sent a destroyer and two chasers to Trau, visited the Serbian commander and secured his agreement not to attack Trau until American forces tried to get the Italians to withdraw. Lieutenant Commander R.S. Fields and Commander Marony of the Italian vessel *Puglia* went to Trau by automobile and persuaded the renegade Italians to withdraw. However, one of their trucks broke down, leaving the Italian captain and three soldiers stranded in Trau. *Olympia* and the U.S.S. *Cowell* put a lightly equipped landing force of 101 men and officers ashore to preserve order and protect the Italians pending the arrival of Serbian troops. The Italians were evacuated by motor boat. When the Serbians arrived, Boyd withdrew his force after receiving assurances that no reprisals would be taken against civilians. The Italians court-marshalled the insubordinate captain who led the incursion. Admiral Knapp reported:

The whole affair was most creditably handled and the prompt action of Captain Boyd in my opinion undoubtedly prevented a very serious incident which might have resulted in open warfare between Italians and Serbians.⁴³

From April 1920 to May 1921 *Olympia* was Flagship of U.S. Naval forces in the Adriatic Sea. In December 1920 she was ordered to proceed to the Black Sea and assist evacuation of Russian refugees who were being driven out of the Crimea by the Bolsheviks. The mission was accomplished without her assistance and she was ordered to Ragusa, Dalmatia to assist in caring for refugees who had been landed there and were in desperate need of food and shelter.

⁴³Harry S. Knapp, Rear Admiral, U.S.N., at London, a dispatch to Secretary of the Navy Josephus Daniels, Washington D.C., September 30, 1919. Ship's History Center, Washington Navy Yard, Washington, D.C.

Smallpox and typhus were endemic. *Olympia* provided relief supplies, medical care and sanitation.⁴⁴

Her last major mission started on October 25, 1921 when she embarked the body of the Unknown Soldier at Le Harve, France. The *Olympia* was chosen for this honor because of the high regard in which she was held by the American people.⁴⁵ While at Le Harve the casket had been secured to the deck at *Olympia's* stern. Rough weather was a possibility and the casket was moved to the elevated after signal bridge. The casket remained topside because no hatch was large enough to pass the casket through "with dignity", that is, without upending it. Nearing the Azores, *Olympia* passed through so violent a storm, that Captain Erskine was concerned that the ship might capsize. He asked Lieutenant Edward A. Duff, Chaplain to pray for the ship's safety.

The chaplain and members of the crew off watch assembled in the mess hall, clinging to stanchions as the ship tossed about. Duff reassured the men that God was watching over them and their ship. Together they prayed that the Unknown Soldier, high above them on the after weather deck, would safely be returned to his homeland.

As she stood up to the Washington Navy Yard *Olympia* was joined by the battleship *North Dakota* and the destroyer *Bernadou*. The ship and her escorts arrived at 4:00 PM on November 9. The body of the Unknown Soldier was piped over the side with full military honors, *Olympia* firing a last salute.

Olympia continued cruising as Flagship of the Train until April 22, 1922. She served as a training vessel for the Naval Academy's summer cruise of 1922. On September 1, *Olympia* arrived at Philadelphia and was decommissioned on December 9, 1922.

Olympia's Famous Officers

Admiral George Dewey

George Dewey was born in Montpelier, Vermont on December 26, 1837. His father was a Doctor who in later life started the National Life

⁴⁴"History of the *USS Olympia*" (Washington D.C.: Division of Naval History-Ships' Histories Section-Navy Department, 1957) photocopied.

⁴⁵An extensive discussion and history of American Military funerals was covered in B.C. Mossman and M.W. Stark, The Last Salute: Civil and Military Funerals 1921-1969, (Washington, D.C.: Department of the Army, 1971), 9.

Insurance Company of Montpelier. Dewey had a reputation as a reckless youth, full of mischief and a player of creative practical jokes. In 1852, Dewey attended the Norwich Military Academy at Norwich, Vermont.⁴⁶ He liked military life and expressed the desire to enter the Naval Academy at Annapolis. Vermont's Senator Foote named Dewey as his alternate appointment. Dewey received the appointment when Foote's first choice withdrew.

In 1854 the military academies buzzed with discord. Southern and Northern factions defended pro-and anti-slavery views and Dewey promptly revealed his abolitionist views. The Southerners succeeded in provoking a quarrel. Dewey fought one of his tormentors and trounced him. Dewey got into another victorious fight when a Southerner hurled an inkstand at his head. He thrashed the thrower who then challenged Dewey to a duel to the death with pistols at close range. Dewey accepted and the rivals were pacing off the distance when officers of the academy intervened and stopped the proceedings.

On graduating in 1858 Dewey stood fifth in his class of fourteen. He was not an exceptional student but he excelled in seamanship and maritime technology. His first cruise after graduation was on the steam frigate *Wabash* on its' Mediterranean cruise. At the time, the Naval Academy gave final examinations after midshipmen had some experience at sea. Dewey did well enough on his final examinations to rise to third in his class with a rank of Passed Midshipman on January 19, 1861.

In February 1861, Dewey received his first commission. With the onset of the Civil War, many Southern officers resigned and the remaining officers were rapidly promoted. Dewey received the grade of Master, which corresponds to the modern rank of Lieutenant, junior grade, on April 18, 1861, six days after the attack on Fort Sumter.

His assignment was aboard the steamer *Mississippi* with the West Gulf Blockading Squadron under Captain David G. Farragut. Their mission was to capture New Orleans.

⁴⁶Joseph Stickney was an ex-naval officer who attached himself to Admiral Dewey as an aide, biographer and publicity agent during the campaign in the Philippines. A contemporary account of Stickney's exploits, Dewey's biography, an economic report on the Philippines and the native insurrection which followed American intervention is found in Joseph L. Stickney, Life and Glorious Deeds of Admiral Dewey, (Philadelphia, : Franklin Square Bible House), pp. 123-155.

Farragut started with seventeen wooden vessels that faced fighting against the swift river current, forts, two powerful earthworks armed with cannon and sharpshooters, burning rafts floated down the river to harass his forces, obstructing chains across the river and fifteen Confederate vessels. Farragut captured or destroyed all the Southern vessels at a cost of thirty-seven men killed and 147 wounded. He lost only one vessel.

From January 1863, the *Mississippi* aided army units attempting to invade the interior of Louisiana. By March, Farragut's forces consisted of fourteen vessels directed at moving north of Port Hudson and setting up patrols on the river above. The shore batteries at Port Hudson inflicted considerable damage on the task force. During the attempt to pass the last battery, the *Mississippi* went hard aground. After a desperate attempt to get free while under enemy fire, the crew spiked her guns, took off the wounded in the ship's boats, destroyed the engine, set fires and abandoned ship. At 3:00 AM the *Mississippi* floated free, drifted down the river and blew up when the fire reached her magazines. Dewey received a commendation for his coolness under fire and his actions in abandoning the vessel.

Dewey held a variety of second-in-command assignments on gunboats in the Mississippi River. The Navy transferred him to the *Agawam*, part of the North Atlantic Blockading Squadron.

The Confederates had an immense fort at the mouth of the Cape Fear River in North Carolina. Fort Fisher protected the blockade runners that were supplying the South with war material. The Southern forces repelled the first attack on Fort Fisher. During the second battle for the fortress, Dewey, aboard the *Colorado*, devised a tactical maneuver that brought the vessel close enough in to the fort to batter and silence a particularly active battery. His superiors recommended promotion to Fleet Captaincy but the Navy Department did not act on the recommendation. He did receive promotion to Lieutenant Commander on March 3, 1865.

In eleven years of service he reached a rank that in peacetime required about thirty years of service. His association with Farragut, Porter and other masters of naval warfare gave him a practical knowledge of strategy and tactics.

Dewey married Susie Goodwin, daughter of Ichabod Goodwin, a former governor of the State of New Hampshire, on October 24, 1867. Dewey's peacetime duties included a tour at the Naval Academy until 1870. On September 28, 1870 he assumed command of the *Narragansett* and on July 27, 1871 he was transferred to command of the hospital ship *USS Supply*. On July 27, 1871 he received orders assigning him to the Navy Yard, Boston, Massachusetts.

Dewey's wife gave birth to a son, George Goodwin Dewey, on December 23, 1872. Tragically, Mrs. Dewey died one week after childbirth, bringing an end to a happy marriage.

Starting in 1875, Dewey performed a variety of routine assignments in the peacetime navy. The Navy conferred the rank of commodore in 1889. Details of his career appear in Appendix F.

In the late nineteenth century the American public became concerned and increasingly agitated over Spain's treatment of its possession, Cuba. Expansionist sentiment pushed for acquisition of Cuba by the United States. Another viewpoint protested the brutal treatment of Cuban political prisoners by the Spanish government and believed that intervention in the name of humanity was unavoidable. Although public sentiment supported the Cuban insurgents, the American Navy enforced neutrality, with the Atlantic Squadron essentially a police force. It prevented guns, ammunition and aid from reaching the rebels.

During the months before war with Spain, John D. Long was secretary of the Navy with Theodore Roosevelt as his assistant. The rank of Admiral had lapsed; authority rested entirely with the civilian Secretary or in his absence, his assistant. Roosevelt's vision saw the United States as a great and determined power in two oceans, controlling an isthmian canal that joined them. He believed that "War would enoble the American nation by purging the people of their preoccupation with material gain." Roosevelt's beliefs were at odds with Long who rejected the expansionist and martial arguments. The ongoing friction between the two men did not deter Long from taking an extended vacation and during his absence Roosevelt had a "bully time" as Acting Secretary.⁴⁷ Roosevelt wanted a commander in charge of the Asiatic Squadron who would promptly and aggressively attack the Philippines, Spain's colony in the Pacific, if war with Spain broke out. At the time the average American had little knowledge about the Philippines. There were few commercial links and Filipinos were not being proselytized by the American Protestant missionary societies. To Americans war with Spain would be a fight over Cuba.

The exception to American indifference over the Spanish possessions in the Pacific was George Dewey. He believed that war with Spain was inevitable and was Roosevelt's choice for command in the Asian waters. The Bureau of Navigation preferred John A. Howell, commandant of the Philadelphia Navy Yard for the assignment. This dismayed Roosevelt, who feared that Howell would bungle any attack

⁴⁷Walter R. Herrick Jr., The American Naval Revolution, (Baton Rouge: Louisiana State University Press, 1966), 219.

on the Philippines. While Roosevelt disdained using political pull, he believed that "while it was unpardonable to bring pressure for a soft place, leniency should be observed toward a man who used influence to get near the flashing guns." He and Senator Proctor of Vermont obtained President McKinley's promise that Dewey should have command.⁴⁸

On November 30, 1897, the Navy ordered Dewey to the Asiatic Station. He proceeded by steamer to Hong Kong and assumed command on January 1, 1898, with his flag in the protected cruiser, *USS Olympia*.⁴⁹

On February 15, 1898 the battleship *Maine* blew up while moored in Havana Harbor taking 250 men with her to the bottom. The official Navy report, delivered to Washington on March 25th, did not fix responsibility for the tragedy. The battleship blew up on the port side with the shock causing explosion of two magazines. There was no evidence of a Spanish conspiracy and no proof that there were any mines in Havana harbor. On March 28th the nation's newspapers carried a copy of the report that an unknown source leaked before Congress got the official report. Primed for conflict, the nation read the non-committal conclusion of the report as proof that Spain was guilty of blowing up the *Maine*. The American people adopted a wartime mentality and "Remember the *Maine*" became their battle cry.

The continental powers feared that an aggressive war would lead to American expansion. Germany, whose colonial agenda included purchase of the Philippines, secretly advised Spain to avoid a war she could not win. Spain was under pressure to grant Cuban independent status-with the Pope offering to mediate between Spain and the rebels. McKinley feared that diplomacy could not defuse the situation, but he wished to avoid censure for plunging into war without attempting conciliation. Congress wanted war and defied the President's attempts at diplomatic solution. Secretary of the Navy John Long agreed with McKinley's position and knowing the condition of the American Navy, flinched at the hazards of war. With a veto-proof majority of both houses supporting a declaration of war, the President capitulated and on April 20 took action that ended

⁴⁸An even-handed history of the Spanish-American War can be found in a book by Margaret Leech, In the Days of McKinley, (New York: Harper & Brothers, 1959), 160 and passim.

⁴⁹Frederic Stanhope Hill, Twenty-Six Historic Ships - The Story of Certain Famous Vessels of War and of their Successors in the Navies of the United States and of the Confederate States of America From 1775 to 1902, (New York and London: G.P. Putnam's Sons - The Knickerbocker Press, 1903), 445.

diplomatic relations with Spain and signaled the outbreak of war on the 21st. A Cuban blockade started on the 22nd and McKinley issued a call for volunteers on the 23rd.

On April 24th Dewey, preparing his task force at Hong Kong, received orders directing him to proceed to the Philippines and "commence" operations against the Spanish fleet. Dewey's orders read: "You must capture or destroy. Use utmost endeavors." McKinley signed the formal legal declaration of war Monday, April 25, 1898.
⁵⁰

Appendix G is Dewey's official report of the battle of Manila Bay. Dewey and his squadron annihilated the Spanish fleet at Manila Bay without losing a single man. Several men suffered minor wounds. However, Dewey did not have the troops needed to pacify and hold the city of Manila. General Merritt assembled an expeditionary force in California but it did not arrive until July 25th. Ultimately 11,000 men joined the pacification force. During the blockade period Dewey had not communicated about his problems with the German fleet in Manila Bay. Newspaper accounts revealed that the Germans had ignored the American blockade and were suspected of organizing native forces to counter the American incursion. In July a German cruiser prevented Aguinaldo, a native military leader who at that time was loosely allied with the American forces, from seizing an island at Subic Bay. Dewey countered by sending two cruisers to the scene and demonstrating that he would take military action against the Germans if they did not withdraw. The Germans prudently retired.

Olympia remained in the Philippines until May 20, 1899, assisting in the blockade and capture of Manila and aiding the army in repelling the attacks of the natives. She arrived at Hong Kong on May 23, 1899, and on June 6, 1899 departed China for her return to the United States, via Suez and the Mediterranean. Arriving at Boston October 10, 1899, she went out of commission in reserve on November 8, 1899.

In an early October evening in 1900, Dewey, now promoted to Rear Admiral, arrived in Washington to a hero's welcome. A reproduction of the *Olympia's* prow projected from the front of a reviewing stand south of the Treasury building. Pennsylvania Avenue blazed with modern electric lighting and searchlights bathed the public buildings in brilliance. Twelve-thousand members of civic organizations and fraternal societies stood in side streets, ready to march. Dewey had previously received honors at a huge parade in New York and was suffering from partial paralysis of his right arm from shaking hands with officials and the public.

⁵⁰Leech, McKinley, 1959, pp. 193, 285, 412, 429.

The parade started with explosions of fireworks and bursting fire bombs. A troop of cyclists pedaled by on wheels hung with Chinese lanterns. Catholic societies brandished red torches. The Washington Navy Yard machinists marched preceded by a six-inch rifled cannon from the gun factory, labeled "We make the guns for Dewey." The postal workers paraded in mail cars, decorated with electric signs and a giant envelope, addressed to Dewey and stamped "Returned to Washington."

Some marchers broke ranks and surrounded the reviewing stand. Dewey took advantage of the confusion to retire to a private house; the K Street residence of Mrs. Washington McLean. Several days of receptions and celebrations followed. Dewey was inundated with golden gifts, swords, plaques, loving cups, coins, badges, eyeglass cases, paper cutters and cigar boxes. Souvenir makers took advantage of Dewey's popularity and flooded the country with commemorative plates, decorative spoons, Dewey blouses, Dewey hats and even a chewing gum, "Dewey Chewies."

With the public infatuated with Dewey and his accomplishments, it followed that he would be considered as a Presidential candidate to run against McKinley. He had never stated political views and a number of prominent Democrats believed that his candidacy could wean the party away from William Jennings Bryan and his "free silver" platform. The political pressures on Dewey were flattering but ultimately proved annoying. He developed an aversion to the anti-expansion, anti-imperial wing of the Democrat party. He referred to the Democrats as "Those rattled-pated (sp) people who are doing so much wild talking." McKinley commented with relief that "Dewey evidently realized that public sentiment and his fame were safer in the hands of the Republicans than in those of the opposition."

The American people believed Dewey belonged to the nation. Plans to have him reside in Washington as a living national institution excited the popular imagination. Donations totaling \$50,000 paid for his mansion on Rhode Island Avenue. But his popularity plunged when he married Mrs. Washington McLean's daughter, Mrs. Hazen. Dewey's choice of a rich, Catholic widow 14 years his junior stirred public indignation in traditionally Protestant America. When Dewey transferred title to the mansion to his new wife, many took it as a gesture rejecting the adoration of the public. The popular annoyance quickly died down, and was replaced by a civilized politeness.

Early in 1900 Dewey changed his mind and announced that he was willing to be a candidate for the Presidency. By this time both Bryan and McKinley had a majority of votes lined up in the coming conventions and Dewey's candidacy was irrelevant. Dewey lived on, a guest of honor at banquets and ceremonies. His accomplishments

and memories of the Spanish-American War fading away, eclipsed by the events preceding World War I. Dewey died in Washington, D.C., on January 16, 1917.

Captain Gridley

Charles Vernon Gridley was born in Logansport, Indiana on November 24, 1844. His early years were spent in the state of Washington and he was appointed to the U.S. Naval Academy, Annapolis, Maryland from that state in 1860. He was graduated in 1863 and assigned to duty in *Oneida* and in 1863 participated in the Battle of Mobile Bay.

In November 1866 he was promoted to the rank of master and ordered to the steam sloop *Kearsarge* of the South Pacific Squadron. On February 21, 1867, he was promoted to the rank of Lieutenant. After an assignment in *Michigan* (later named *Wolverine*) during 1870-1872, he was assigned to *Monangohelia* in the South Atlantic Squadron as executive officer from 1873-74. From 1875-79 he served at the Naval Academy.

Following this service, he was assigned to *Menton*, flagship of the European Squadron from 1879-81. He was promoted to Commander on March 10, 1882 while on duty at the Boston Navy Yard. From 1884-86 he was in command of the training ships *Jamestown* and *Portsmouth*. He served in the lighthouse service from 1889-91 at Buffalo, N.Y.

He was on duty at the Navy Yard, Washington, D.C. from 1891-92 under instruction in ordnance and gunnery. He commanded the cruiser *Marion* from 1892-94, on the Asiatic Station. He had another tour of duty in lighthouse service with headquarters at Buffalo, N.Y. In March 1897 he was promoted to the rank of Captain and ordered to command the receiving ship *Richmond* at the Philadelphia Navy Yard and in June 1897, was ordered to the Asiatic Station where on July 26, he assumed command of *Olympia*, flagship of the Asiatic Squadron.

Shortly before the Battle of Manila Bay, Gridley became terminally ill and was declared physically unfit for further active service. He protested the ruling and was permitted to retain his command.

When action against the Spanish became imminent, Dewey gave his famous command: "You may fire when you are ready, Gridley." This virtually placed upon Captain Gridley the responsibility of commencing the action - a compliment of the highest order. Gridley remained in the conning tower of the *Olympia* all through the battle, directing fire. The stress and pressure weakened him further. Shortly after the battle he was relieved by Captain Lamberton and ordered home. Dewey commended Gridley and recommended

he be advanced ten numbers on the promotion list as a reward for his ability and judgement. He was awarded six numbers.

Gridley died in Kobe, Japan, while enroute to the United States, on June 4, 1898. He was buried at Tahinde Cemetery, Erie, Pennsylvania where four guns from the arsenal of Cavite were placed at his grave.

Two destroyers have been named in his honor. The first was launched at Bethlehem Shipbuilding Corporation, San Francisco, California in 1918. His daughter Ruth was the sponsor. The second was launched at the Bethlehem Yard at Fore River, Quincy, Massachusetts in 1936 and was sponsored by his daughter Katherine.⁵¹ 1

Present Status of Olympia:

After decommissioning, *Olympia* remained at the Philadelphia Navy Yard reserve basin. Vandals and souvenir hunters damaged and stripped her. She lay as a deserted berth while her sister ships of the old "White Fleet" went to the ship breakers. Only the *Oregon* and the *Olympia* remained. *Oregon* survived as a museum ship in Portland, Oregon while the *Olympia* lay abandoned. With the onset of World War II, the Governor of Oregon offered the *Oregon* for active duty but the War Production Board felt she was more valuable for scrap metal. President Franklin D. Roosevelt reluctantly concurred and on October 26, 1942 wrote to Secretary of the Navy Frank Knox:

Dear Colonel Knox:

It is with great reluctance that I authorize the Navy Department to turn the *U.S.S. Oregon* over to the War Production Board for reduction to scrap metal.

It is my understanding that the Department will take immediate action toward the preservation of the *U.S.S. Olympia* as a naval relic of the Spanish-American War period.

Sincerely yours,

Franklin D. Roosevelt

The Navy Department did not follow Roosevelt's recommendation and *Olympia* lay rusting in Philadelphia until 1954 when Congress authorized disposition of all the Navy's historic relics except the

⁵¹Captain Gridley's official obituary is a concise source of information. See United States Navy, "Captain Charles Vernon Gridley, U.S. Navy - Deceased," (Washington, D.C. - Navy Ships History Center, Washington Navy Yard).

Constitution. Those not accepted by museums or patriotic organizations were to be sold for scrap. Under the leadership of Henry D. Learned and Francis D. Pastorious, a committee of Philadelphians raised funds to fulfill the Navy's preservation requirements. The *Olympia* was transferred to the Cruiser *Olympia* Association of Philadelphia on September 11, 1957 with Captain Edmund A. Crenshaw, U.S. Navy (Retired) as custodian.⁵² The Keystone Drydock and Shipbuilding Company made repairs to ensure the safety of visitors. Keystone agreed to underwrite the cost of repairs subject to reimbursement by the Association's fund raising efforts. The Association agreed to submit a plan to the Navy within one year after transfer, which would detail how restoration of the vessel would be accomplished.

The Association went bankrupt and the creditors sued for the unpaid repairs. The court refused to allow the bankruptcy with the judge commenting that he "would throw the *Olympia* into bankruptcy when he did the same for Independence Hall." All claims were settled by compromise.

A new Cruiser *Olympia* Association was formed in 1964 with Caspar J. Knight as Chairman of the Board and fund raising efforts started. Funds were not available for restoration or first-class maintenance. By 1968 *Olympia's* paint was peeling, decks needed refinishing and her masts needed repairing. Volunteers from the Philadelphia Navy Yard and the Police Department worked on the vessel and a fund drive for \$250,000 initiated. The flag officer's quarters, warrant officers wardroom and officer's staterooms and wardroom were restored and some original furnishings recovered and reinstalled. The vessel was turned over to the Philadelphia Independence Seaport Museum in January 1996.

Today the *Olympia* floats at the Philadelphia Independence Seaport Museum as the sole surviving relic of the Spanish-American War and the first steel U.S. Naval ships.

⁵²When the *Olympia* was turned over to the Cruiser *Olympia* Association, a booklet including a brief history of the ship was published. It is a useful contemporary source of information on the events of the transfer. See Edmund A. Crenshaw Jr., U.S.N. U.S.S. Olympia - Admiral Dewey's Flagship, (Philadelphia: The Patriotic Order Sons of America, ca. 1959), 17-19.

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USS OLYMPIA MAY 23, 1916	SUPERSTRUCTURE DECK AND BOAT STOWAGE	DWG. 4274
USS OLYMPIA JULY 13, 1916	MAIN DECK	DWG. 4321
USS OLYMPIA AUGUST 24, 1916	INBOARD PROFILE	DWG. 4350
USS OLYMPIA NOVEMBER 4, 1916	EXPANSION OF SHELL PLATING	DWG. 23
USS OLYMPIA MAY 1, 1916	PROTECTIVE & BERTH DECK, INBD PROFILE	DWG. 767
USS OLYMPIA OCTOBER 30, 1916	PROTECTIVE DECK & FLATS	DWG. 761
USS OLYMPIA MARCH, 1918	BERTHING & MESSING ARRANGEMENTS	DWG. 4683
USS OLYMPIA NOVEMBER 2, 1916	DOUBLE BOTTOM, HOLD & PLATFORM DECK	DWG. 4683-41

B. Historic views:

The Frances Benjamin Johnston Collection - Library of Congress; Prints and Photographs Division.

Title: People and activities aboard the U.S.S. Olympia
Call Number: LOT 8868 (G) <P&P>

Creator: Johnston, Frances Benjamin, 1864-1952, photographer.
(see Appendix D for specific titles and call numbers.)

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APPENDIX A
AS-BUILT SPECIFICATIONS FOR THE OLYMPIA

APPENDIX B
SHIPBOARD ROUTINE IN THE UNITED STATES NAVY - 1902

APPENDIX C
THE "BOUNDING BILLOW."

APPENDIX D
PHOTOGRAPHS OF ACTIVITIES ABOARD THE U.S.S. OLYMPIA

APPENDIX E
HISTORY OF USS OLYMPIA (IX-40)

APPENDIX F
ADMIRAL OF THE NAVY GEORGE DEWEY
UNITED STATES NAVY, DECEASED

APPENDIX G
UNITED STATES NAVAL FORCE ON ASIATIC STATION.
FLAGSHIP OLYMPIA - OFFICIAL BATTLE REPORT

APPENDIX A

As-built Specifications for the Olympia

Source:

Carney, R.E., U.S. Navy, Assistant Engineer, "Contract Trial of the Olympia," Journal of the American Society of Naval Engineers, sine loco: May 1894, Volume VI, Number 2.

The hull is constructed throughout of mild, open-hearth steel. The outside keel plate is $\frac{9}{16}$ inch thick reduced at the ends to $\frac{1}{2}$ inch, the inner keel plate and the outside plating $\frac{1}{2}$ inch thick, the former reduced to $\frac{7}{16}$ inch at the ends. The sheer strake is extra heavy, being 1 inch thick, reduced to $\frac{3}{16}$ inch forward and aft, and the inner bottom plating is of $\frac{5}{16}$ inch metal.

There are ninety-one frames, spaced four feet apart within the limits of the double-bottom space, and three feet six inches apart forward of and abaft this space.

On each side of the vertical keel are four longitudinals, of which the two on each side nearest to the vertical keel are watertight. The fourth one on each side is simply a Z-bar.

Armor:- The protective deck is two inches thick on the flat, and four and three-quarters on the incline, between the limits of the machinery space, the latter dimension being reduced to three inches outside those limits. In the wake of the engine-room hatch, where the tops of the main cylinders require additional vertical protection, a glaxis plate four inches thick is worked in, inclined at an angle of thirty degrees.

Battery:- The battery consists of four 8-inch breech-loading rifles mounted in pairs in two barbettes, one just forward of, and the other abaft the central superstructure ; ten 5-inch rapid-fire rifles in broadside on the main deck, four 6-pounders on the superstructure deck, under the bridges, and ten 6-pounders on the berth deck. In addition there are to be six Howell torpedo tubes, one at the bow, one at the stern and two on each broadside, fitted to discharge their torpedoes from above water.

Inner Bottom:- The inner bottom extends from frame No. 26 to frame No. 66, inclusive (practically the limits of the machinery space), a distance of one hundred and sixty feet, and, with the frames, longitudinals and vertical keel, forms sixteen double-bottom compartments proper. Further water-tight subdivision below the protective deck is provided for by eleven complete and three partial transverse bulkheads, a complete longitudinal bulkhead extending on the midships line from frame No. 26 to frame No. 66- this being continued forward to frame No. 20 and aft to frame No.

78, as a partial bulkhead-and by the inner bunker bulkheads. Of the three partial transverse bulkheads, two extend as high as the protective deck, but only between bunker bulk heads, while the third extends only as high as the after platform or orlop. This subdivision, with the water tight subdivision above the protective deck, comprises one hundred and thirty seven compartments, making a total of one hundred and fifty three water-tight compartments in the ship. Included are the trimming tanks, two forward and two aft, so connected by sluice valves to the regular pumping system that they can be used for giving the desired trim to the vessel. There are forty coal bunkers in the ship, twenty above and twenty below the protective deck, and they, also, form part of the water-tight subdivision. Along each side, at the junction of the protective deck to the hull, and extending longitudinally from frame No. 5 to frame No. 81, is a cofferdam rising vertically to a height of four feet above the load-water line. The forward end, for a distance of eighteen and a half feet, is carried up to the torpedo flat. The compartments of these dams are to be filled with some water-excluding material like cellulose or " Woodite."

Drainage and Pumping:- The main drainage system consists of an 11 inch pipe on each side of and parallel to the vertical keel, and extending from the forward fire room on each side to a well below the forward end of its corresponding engine room, all of the system being within the double bottom. The boiler space comprises four water-tight compartments, and all the surface drainage from the inner skin in the firerooms is taken by a strainer for each compartment-making two for each pipe-and is thence led to the cisterns aft. The drainage of each engine room is led to the main drainage cistern in the forward part of the engine room, or to a well at the after end of same. There is a special drain pipe front the crank pits, fitted with a hand pump, or to discharge into the main cistern through a non-return valve. The bilges throughout are cemented, with midship gutters, and proper depressions for the strainers, which latter, by the way, are fitted with both hand and automatic non-return valves.

The secondary system is of 6-inch piping, half on each side of the midships line, and has communicating valves to connect it to the main system. By means of manifolds, or bilge boxes, and a system of 4-inch piping, any or all of the double-bottom compartments, or of the lower compartments forward or abaft of them, can be filled with water or emptied at will. The secondary drain extends from the bilge boxes in the forward fire rooms to those at the after end of the engine rooms, the portion in the boiler space being raised above the inner skin. All the suction to the different compartments have basket strainers, accessible from the inner skin for change or examination. The cisterns to which all this drainage goes are pumped by either of two ways. Ordinarily it is by means of a bilge-box connection, making either the fire and bilge pump or

engine-room auxiliary pump available. In case of emergency - as to clear the ship of water in case of a leak - the bilge injection furnishes means of using the centrifugal circulating pumps either to discharge through the condensers or directly overboard. In addition there are four hand pumps-three 7 1/2 inch and one 5-inch with suction to the valve boxes, and thus to the secondary drains. Steam-pump suction from the secondary drains is furnished by the fire and bilge and auxiliary engine-room pumps, and by the four auxiliary feed pumps.

SUMMARY OF HULL DATA
AT COMPUTED LOAD DRAUGHT OF 21 FEET 6.8 INCHES.

Length between perpendiculars, feet and inches	340-00
Length over all, feet and inches	344-0 ³ / ₄
Beam, extreme, at L.W.L., feet and inches	53-0 ⁵ / ₈
Draught, mean, normal, feet and inches	21-6.6
Area immersed midship section, square feet	1,013
Displacement, tons	5,872.16
Tons, per inch	29.36
Center of buoyancy above base line, feet and inches	12-6
Center of buoyancy aft of midship section, feet and inches	3-4 ¹ / ₂
Center of gravity above base line, feet	20.517
Transverse metacenter above C. B., feet and inches	10-1 ¹ / ₄
Longitudinal metacenter above C. B., feet	353
Distance from COG* to transverse metacenter, feet	2.087
Distance from COG* to longitudinal metacenter, feet	332.53
Coefficient of displacement	0.520
Coefficient of midship section	0.886
Coefficient of L.W.L	0.744
Cylindrical coefficient	0.587
Area of L.W.L. plane, square feet	13,421.4
Wetted surface, square feet	24,864.0
COG*=center of gravity	

Main Engines:- There are two vertical, inverted, direct-acting, three-cylinder, triple-expansion engines, side by side, with a midships water-tight bulkhead between them, the engine rooms being connected at the level of the middle platform by two water-tight doors. The cylinders are of the best quality of cast iron, and all are fitted with linings of hard, close-grained iron, the annular spaces around the I.P. and L.P. linings forming steam jackets for those cylinders. The linings are accurately bored to the following diameters: H.P., 42 inches; I.P., 59 inches, and L.P., 92 inches, and counterbored at both ends, leaving a working length of barrel of 3 feet 8¹/₄ inches, for a 42 inch stroke. The valve gear is of the Stephenson type, with double-bar links working the valve directly, the cut-off for full gear taking place at about .7 of the stroke. Within small limits the travel of each valve is adjustable

by means of four slots in the reversing arms. The valves are of the piston type, those for the H.P. being balanced by making the upper half of the valve 1 inch greater in diameter than the lower half, while the intermediate and low-pressure valves are fitted with balance pistons. The reversing gear consists of a steam cylinder and a hydraulic controlling cylinder, the piston rods of both fitted to the same crosshead, and the ends of the hydraulic cylinder connected with a by-pass, Worked from the stem of the steam starting valve. These valves receive their primary motion from a hand lever at the starting platform, and are stopped by a system of levers receiving motion from a pin on the reversing arm, the parts being, so adjusted in this system that the reversing engine follows the motion of the hand lever, and when stopped is firmly held by, the controlling cylinder. There is also a small hydraulic pump for reversing by hand.

Each engine has a 15-inch gate-stop valve, and a gridiron throttle valve, the latter worked from the lower platform by a hand wheel, worm and gear.

The main pistons are of cast steel and dished, and each has two packing rings $1\frac{1}{2}$ inches wide and $\frac{3}{4}$ inch thick, set out by steel U-springs. The piston rods, connecting rods and crossheads are of forged steel, the latter being fitted with composition slippers faced with hammered white metal. The engine framing consists of one inverted Y-frame at the back of each cylinder, and a pair of forged-steel columns in front. The Y-frames are built up, having wrought-iron side pieces secured to a cast-iron body piece which carries the crosshead slide, and to which the backing slides are bolted. Both Y-frames and columns are secured at the bottom to manganese bronze bed plates. The latter in turn being held down by forged-steel bolts. The crosshead guides are cored out for circulating cooling water. The eccentrics are in two parts, of cast steel, keyed on to the shaft, the go-aheads with adjustable side keys. The eccentric straps are of composition, while the rods, with the links, link blocks, suspension rods and valve-stem crossheads, are of forged steel. The exhaust system between valve chests is external, and consists of copper piping. All important valves in connection with the steam system, including the safety valves, are fitted to be operated either from the berth deck or from below.

ENGINE DATA.

Number of cylinders, each engine	3
Diameter of cylinders, H.P., inches	42
Diameter of cylinders, I.P., inches	59
Diameter of cylinders, L.P., inches	92
Ratio of piston areas	1-0: 1.973:3: 4.798
Diameter of piston rods, inches	81

Stroke, inches	42
Length of connecting rod between centers, inches	84
Volume swept by L.P. piston, in cubic feet	161574
Diameter of H.P. valve, one/engine, inches	Top 18 $\frac{1}{2}$
	Bottom 17 $\frac{1}{2}$
Diameter of I.P. valve, two/engine, inches	23
Diameter of L.P. valve, four/engine, inches	21

Shafting:- The shafting is steel throughout, and all shafts are lightened by axial holes. There are three crank shafts for each main engine, interchangeable and reversible, and so joined as to bring the cranks, 120° apart, in the following sequence: H.P., I.P., L.P. The length of each section is equal to the distance between the axes of the piston rods, 9 feet 7 $\frac{1}{2}$ inches. The crank pins are 21 $\frac{1}{2}$ inches long and 17 inches diameter. The crank webs are 10 $\frac{1}{2}$ inches thick, and taper from 18 $\frac{1}{2}$ to 17 $\frac{1}{2}$ inches in width. The axial holes in crank pins and journals are respectively 8 $\frac{1}{2}$ and 7 $\frac{1}{2}$ inches. The coupling flanges at the ends of these sections are 2 feet 7 inches in diameter, and 31 inches thick, each drilled for six forged steel bolts, 3 $\frac{1}{2}$ inches diameter, with wrought-iron nuts and split pins. At each end of each section is a raised eccentric seating 9 inches long and 17 inches in diameter.

Each thrust shaft is 19 feet 5 $\frac{1}{4}$ inches long, and has twelve collars, two inches wide, and separated from the adjacent one by 3 $\frac{1}{2}$ -inch spaces. The collars are 20 $\frac{1}{2}$ inches in diameter, and the shaft 15 $\frac{3}{4}$ inches. Just abaft the forward flange is a raised eccentric seating for the after L.P. eccentrics, similar to those on the crank shafts. The thrust shafts also have bearing journals forward and abaft the collars to take the weight off of the latter, and are lightened by 7 $\frac{1}{2}$ inch axial holes.

The line shafts are each 35 feet long, 151 inches diameter, lightened by a 7 $\frac{1}{2}$ -inch axial hole, and have a socket at the after end into which is fitted the tapered forward end of the propeller shaft. An independent disc or flange is screwed on this taper, and serves as a coupling flange for the propeller shaft, which is also secured by feather keys.

The propeller shafts are each 39 feet long, including the taper at inboard end, which extends two feet into the socket of the line shaft; they are 16 inches in diameter, with a 7 $\frac{1}{2}$ -inch axial hole. The shafts are cased with a composition sleeve $\frac{5}{8}$ -inch thick, except where it forms a journal, when it is increased to 1 inch.

The main bearings are fitted only with bottom brasses, the cap itself serving as the other brass, both it and the bottom brass being lined with white metal. The thrust bearing is of cast iron, the collars having white metal facings. The cap is similarly fit-

ted. The body of the bearing has a trough, with stuffing boxes around the shaft to be filled with oil, which is supplied to the thrust facings through holes between the collars. A cooling coil connected with the engine-room water service keeps the liquid in the trough cool. The holes for holding down bolts are elliptical to allow for adjustment. At the forward and after ends of the trough are ordinary bearings lined with white metal, and capable of vertical adjustment to take the weight of the shaft from the thrust collars.

In each stern tube are composition bearings about 3 feet long each, and fitted with lignum vitae on end of grain. The strut bearings are similarly fitted with composition bushings and lignum vitae.

Screw Propellers:- There are two three-bladed screw propellers, the starboard one right, and the port one left handed. They are of manganese bronze, 14 feet 9 inches in diameter, and the pitch is adjustable between 18 feet 6 inches and 19 feet 6 inches. During the trial it was 19 feet mean. The disc area of each is 170.9 square feet, the helicoidal area 68 square feet, and the ratio of the diameter to the mean pitch 1 to 1.288. The hubs are 4 feet diameter. During the trial the average submersion of the tip of the upper blade was 83 inches.

Main Condensers:- There are two main condensers of cast naval brass, 6 feet 6 inches internal diameter, 11 feet to inches long between tube sheets. In each condenser there are 4,904 seamless drawn brass tubes, making a cooling surface of 9,495 square feet for each main engine. The tubes are 1 inch outside diameter, No. 20 B.W.G., and the circulating water passes through them. The ratio of cooling surface of main condensers to total heating surface is about 1 to 1.498.

Air Pumps:- For each main condenser there is a triple air pump, consisting of three vertical single-acting pumps, driven by a like number of simple inverted engines, one engine cylinder over each pump cylinder. In each case there is a steel piston keyed into the upper side of a bronze crosshead, into the lower side of which is keyed a pump rod of hammered phosphor bronze. The crosshead slippers are fitted with white metal bearing surfaces. The crosshead pins are of forged steel, as are also the crank shafts, valve rods, and connecting rods. Heavy cast iron balance wheels at the ends of the crank shafts secure uniformity of rotation. The cranks are 120° apart, and the common stroke of pumps and engines is 20 inches. The steam cylinders are 5½ inches in diameter, fitted with rocking slide valves, and steam is supplied from the auxiliary steam system. The exhaust is either by a special opening into the main condensers, or into the auxiliary exhaust system. The air-pump barrels are of composition, 20 inches in diameter, with composition pistons, valve seats and guards, while the valves and

springs are of phosphor bronze. For each pump there are ten foot valves, eight bucket valves and eight head valves, the latter at the top of the pump chamber. The seats for the foot valves are inclined. For each set of pumps there is a common suction box, just back of and below the foot valves. This has a stop valve in each pump suction, so that any pump can be shut off at will. Behind the head valves is the delivery chamber, and from this the condensed feed water is drawn by a small "tank pump" and forced to the feed tanks in the fire rooms.

Circulating Pumps:- Circulating water for each condenser is supplied by two centrifugal pumps, fitted to draw either from the sea or from the bilge of its engine room, and to deliver into the condenser, or directly overboard by means of a pipe connecting the condenser supply with the outboard delivery. There is a safety locking device fitted to main and bilge injection valves so that one cannot be opened unless the other is tightly closed. The runners of the pumps are 28 inches in diameter, with 12-inch suction and delivery pipes, and each is driven by a compound engine of 6-inch stroke, the cylinders being $5\frac{1}{2}$ and 11 inches diameter respectively. Each pump is capable of discharging 6,750 gallons of water per minute from the bilge.

Boilers:- There are four double-ended and two single-ended steel boilers with horizontal return fire tubes, the former with eight and the latter with four corrugated steel furnaces each. The boilers are placed in four watertight compartments, one double-ended boiler in each forward, and one double and one single-ended boiler in each after compartment. The total grate area is 824 square feet, and the total heating surface 28,298.64 square feet. All the top heads are curved to save staying. The longitudinal seams are butted, strapped inside and out with 1 inch straps, and treble riveted. The circumferential seams between courses are lapped, the middle course being smallest, and treble rivetted, and the joints of the heads with the shells are double riveted. The joints at the furnace mouths and those in the combustion chambers are single riveted. The plates are of open-hearth steel, and the rivets of Clapp-Griffiths steel. The grate bars are of wrought iron, of the shaking pattern, and can be removed or placed without hauling fires. Each single-ended boiler has six, and each double-ended boiler twelve circulating tubes of oval cross-section, in addition to which the internal feed pipes and circulating plates provide for proper circulation of water in the boilers. Hydrokineters of the Weir type are also fitted. The forward smoke pipe is a flat-sided oval, with its greatest diameter in a fore-and-aft direction, and it receives the uptakes of the forward pair of double-ended boilers. The after smoke pipe is circular in cross section and receives the uptakes of the remaining boilers. The tops of the smoke pipes are 75 feet above the longest grates. The tubes are of steel, lap-welded and drawn, the plain tubes of No. 12, and

the stay tubes of No. 6 B.W.G., all 2 $\frac{1}{4}$ inches outside diameter. The stay tubes are screwed at both ends, and protected at the fire ends by cast-iron ferrules. The plain tubes are expanded and beaded over at both ends.

BOILERS.

Steam pressure pounds	160
Length, double-ended, feet and inches	21-3
single-ended, feet and inches	10-11 $\frac{1}{2}$
Diameter, feet and inches	15-3
Thickness of shell plates, inches	1 $\frac{19}{64}$
top heads, inches	1 $\frac{19}{64}$
tube sheets, inch	$\frac{7}{8}$
lower front heads, inch	$\frac{3}{4}$
back heads, single-ended, inch	$\frac{3}{4}$
butt straps, inch	1
combustion chamber sheets, inch	$\frac{1}{2}$
Rivets, diameter " for circumferential seams,	1 $\frac{15}{16}$
longitudinal seams, inch	1 $\frac{1}{4}$
heads, inch	1 $\frac{3}{16}$
combustion chamber sheets, inch	$\frac{3}{4}$
Braces above tubes, diameter, inches	2 $\frac{3}{8}$
to back tube sheet, diameter, inches	2 and 2 $\frac{1}{8}$
Braces above lower man-holes, diameter, inches	2
diagonal in bottom water space, inches	1 $\frac{5}{8}$
Screw stays, diameter, inches	1 $\frac{3}{16}$
pitch, inches	7
Furnaces, inside diameter, inches	39
outside diameter, inches	43
thickness, inch	1 $\frac{7}{32}$
number in each double-ended	8
in each single-sided	4
total	40
Grate, length, feet and inches	6-4
Combustion chambers, number in each double-ended	4
number in each single-ended	2
Tubes, plain, number in each double-ended	796
number in each single-ended	398
outside diameter, inches	21
stay, number in each double-ended	268
number in each single-ended	134
outside diameter, inches	21
length between tube sheets, feet and inches	7-7 $\frac{7}{8}$
spacing, horizontally, inches	31
vertically, inches	3 $\frac{1}{2}$
total number in each double ended	1,064

total number in each single ended	532
Heating surface, plate, each double ended, sq. ft.	77,640
plate each single-ended, square feet	388.20
tube, each double-ended, square feet	4,883.33
tube, each single-ended, square feet	2,441.67
total, each double-ended, square feet	5,659.73
total, each single-ended, square feet	2,829.87
total, all boilers, square feet	28,298.64
Grate surface, each double-ended, square feet	164.8
each single-ended, square feet	82.4
total, square feet	824.0
Ratio heating to grate surface	34.3
Steam space, each double-ended,	
water 6 inches above tubes, cubic feet	990.41
each single-ended,	
water, 6 inches above tubes, cubic feet	564.90
Water-air face, each double-ended,	
same conditions, square feet	287.21
each single ended, same conditions, square feet	
138-02	
Safety valves, number each double-ended	3
number each single-ended	2
diameter, inches	5
load on, pounds per square inch	168
Stop valves, double ended boilers, diameter, inches	10
single-ended boilers, diameter, inches	7

Forced Draft:- Air pressure is maintained in the fire rooms by eight blowers-two for each airtight compartment in the boiler space-the engines being of the compound vertical type, with cranks 180° apart, cylinders 5 and 8 inches diameter respectively, by 6 inches stroke. The fans are 66 inches in diameter, each composed of each composed of eight curved vanes, and deliver directly into the fire rooms, except that light iron baffle plates are fitted to prevent the blowing about of coal dust.

Steam Piping:- The main steam pipes, from the throttles back to the main stop valves are of No. 00 B.W.G. copper, 15 inches in diameter. Extending forward of this through the fire rooms the piping is 12 inches in diameter, with a 10-inch branch to each main boiler stop valve, these branches being No. 0 B.W.G. Connecting the two main separators is a 12-inch copper pipe. All the main steam system of piping is strengthened by steel bands 2 inches wide, $\frac{1}{2}$ inch thick, and spaced 1 inches from center to center. An auxiliary steam pipe, 6 inches in diameter, extends throughout the engine and boiler spaces, with connections to all auxiliary machinery therein, and additional branches to the windlass and ship's ventilating engines, to the engineer's work shop, and to the dynamo and turret engines. This pipe connects with the auxiliary stop valves of all boilers, and with the main steam pipe in each

engine room abaft the separator. Stop valves are also fitted wherever the system cuts a transverse watertight bulkhead. All downward branches are fitted with stop valves close to the auxiliary steam pipe to prevent accumulation of condensed water while the branch is idle, all condensation in the auxiliary steam pipe proper draining either back to the separator or into traps.

Feed Pumps:- There are four main and four auxiliary feed pumps in the fire rooms containing the boiler check valves, i. e., in the four central fire rooms. The arrangement of the fire room pumps is as follows : In each of fire rooms "E" and "F" are two vertical direct-acting pumps of 330 gallons per minute capacity, the steam cylinder being 12 inches in diameter, the water cylinder 8 inches, and the stroke 16 inches. Of each pair, one pump is outboard and the other inboard. In each of fire rooms "C" and "D" are two similar pumps to those above described, except that the stroke is reduced to 12 inches, and the capacity to 220 gallons per minute. As before, one pump of each pair is outboard and one inboard, and in all cases the outboard pumps supply the main feed, and the inboard ones the auxiliary. The main feed pumps draw only from the feed tank and deliver into the main feed pipe, while the auxiliary pumps take suction from either sea, feed tank, bilge or boilers, and deliver into the auxiliary feed pipe, fire main, or overboard through the outboard delivery in its own compartment.

Feed Tanks and Filters:- The feed tanks are built in between the forward and after boiler compartments, and each has a capacity of 1,700 gallons. A portion of each tank is rigged as a filter, and during the trial coarse gunny sacks loosely stuffed with "Excelsior" were used in the filter spaces with excellent results. Water is drawn from the hot wells by the tank pumps, and forced to the feed tanks, the auxiliary air pumps discharging into the same. The tanks are fitted with glass gauges and drain cocks, and each has all overflow to the bilge so arranged that any escape of excess feed water is noticeable. In addition each tank has a suction pipe for the main, and one for the auxiliary feed pumps on its side of the ship, as well as for the corresponding auxiliary engine-room pump.

Distilling Plant:- This consists of two evaporators and two distillers, with a combined capacity of 8,100 gallons of potable water per day. For both evaporators and distillers there is one combined air and circulating pump, which provides cooling water for the distiller, and by connection to the end of each coil evaporation is carried on at or below the atmospheric pressure. The circulating water then passes to the salt-water tank on the upper deck, while the fresh water is pumped into the tanks below, to the supply tank oil deck, or to the feed tanks. There is also a hand-pump connection to the firemen's washroom tank. The evaporators are of the improved Baird type, horizontal, the shells being of plate

steel, lapped and riveted, the heads and flanges of cast iron and the coils of copper, tinned inside and out. The distillers are of sheet brass, with tinned copper coils, fitted with filters, and with the parts accessible for cleaning and repairs.

Auxiliary Condensers:- There is an auxiliary condenser each engine room, connected by the auxiliary exhaust system with all the auxiliary machinery in the ship, each condenser capable of caring for one half. The shells, heads and tube sheets are of composition, while the tubes are of the same size and kind as those fitted in the main condensers, and are similarly packed, i. e., with cotton cord and screwed glands. The condensing water is passed through the tubes, and the total cooling surface for each is 455 square feet. Under each condenser is a combined air and circulating pump of the horizontal, double acting type, both pumps driven by an 8-inch steam cylinder. The air-pump barrels are 11 inches, and those of the circulating pumps 9 inches in diameter, with a common stroke of 10 inches.

Additional Engine-Room Pumps:- At the after end of each engine room is a pair of pumps, duplicates, fitted with the Dow valve gear and governors. (In fact, all pumps in the ship have the latter appliance, and all but the main air and circulating pumps have the valve gear.) These four pumps are of the vertical, direct-acting type, Of 500 gallons per minute capacity each at 60 pounds pressure of steam, with 10-inch steam and 8-inch water cylinders, and an 18-inch stroke. All are fitted to take suction from the hot wells, condenser, sea, bilge of compartment next abaft, secondary drain pipe and drainage cistern, and to discharge into feed tanks, fire main or overboard. One of each pair is designated a "fire and bilge pump," and the other an "auxiliary engine-room pump." In each engine room is a single, vertical, direct-acting pump of 150 gallons per minute capacity, for supplying the water service, and another, the "tank pump," to draw from the hot well and force the condensed water to the feed tanks.

Steering-Gear:- The ship is fitted with hydraulic steering gear consisting of a pair of rams working a yoke on the rudder head. The actuating pressure is 500 pounds to the square inch, and is maintained by a pair of hydraulic pumps at the after end of each engine room. There is no accumulator, but each pair of pumps has a governing throttle, loaded in proportion to the desired pressure, so that the latter is always maintained.

Ice Machine:- Forward on the main deck is a 1 $\frac{1}{2}$ -ton ice machine, of the Allen dense-air type, and just abaft it on the same deck is a large refrigerating room.

Dynamos:- There are four dynamos, each of 400 amperes and 80 volts, and driven by compound engines of the vertical, inverted, direct-

acting type, with cylinders $7\frac{1}{2}$ and $13\frac{1}{2}$ inches in diameter, and a 6-inch stroke.

Turret Engines:- The training power for each pair of 8-inch guns consist of a two-cylinder, simple engine with cylinders 8 inches in diameter and a 6-inch stroke. The engine framing is bolted to a vertical bulkhead below the protective deck, and the crank shaft, by bevel gearing, actuates two worm wheels which gear into opposite sides of a large spur wheel on the foot of the ammunition tube, the latter forming the revolving spindle of the double gun carriage. The limits of train depend on the superstructure of the ship, and automatic stops in the controlling gear of the engines prevent any train in excess of these limits.

WEIGHTS.

Propelling machinery, including water, tons 1,215.23

Reciprocating parts:	Starboard	Port
H.P. piston, pounds	1,682	1,683
I.P. piston, pounds	2,821	2,787
L.P. piston, pounds	5,603	5,540
Piston rods, pounds		4,623
Connecting rod, pounds		17,874
Crossheads, pounds		5,809

THE TRIAL

After several failures to complete a trial, due to weather and other ungovernable circumstances, the official trial took place in Santa Barbara Channel, California, on December 15, 1893. It consisted of a run in each direction over a course 42.9843 nautical miles in length, the mean speed corrected for tide being 21.686 knots.

The previous attempts all stand to the credit of the ship, as altogether the engines and boilers were worked up to the maximum conditions on five different occasions, and after the official trial none but routine cleaning and overhauling was necessary.

In connection with the latter it must be stated that the engineer's department is excellently fitted with appliances for the removal of parts for examination or overhauling. Everything worked excellently during the trial, the boilers furnishing plenty of steam with very slight variation in pressure. There was comparatively little vibration of the main engines, and this is attributed to the athwartships tie rods between the engines, by means of which both bed plates serve for each engine, instead of being separate. As a precautionary measure the water service about the crank shafts was in use. Both auxiliary condensers were in use, receiving the exhaust of all the auxiliaries. Indicator diagram

were taken every half hour from each main cylinder, and every hour from the main air and circulating pumps. The weather conditions were favorable, and the ship maintained a corrected average speed of 21.686 knots.

DATA

Mean draught, forward, feet and inches	19-3 ¹ / ₂
Mean draught, aft, feet and inches	22-2
Draught, mean feet and inches	20-8 ³ / ₄
Displacement, tons	5,586
Tons, per inch at mean draught	29-25
Center of buoyancy above base, feet and inches	12-11
Traverse metacenter above C.B., feet and inches	10-61
Longitudinal metacenter above C.B., feet and inches	366-01
Block coefficient of fineness	.517
Average speed, knots	21.686
Speed ³ X area immersed midship section/H.P.	579.31
Speed ³ X (displacement ² / ₃) / I.H.P	187.67

SYNOPSIS OF STEAM LOG.

	Starboard	Port
Revolutions of main engines per minute	139.98	138.53
Revolution of main engines. mean		139.25
Piston speed, feet per minute	979.86	969.71
Steam at boiler, (gauge)		166.53
Steam at engines, (gauge)	163.75	164.53

	Starboard	Port
Steam at first receiver (absolute)	92.82	95.6
Steam at second receiver (absolute)	31.11	33.53
Vacuum in condenser, inches	24.94	25.59
Opening of throttle		Wide

	Starboard	Port
Steam cut-off in decimals of stroke from beginning, H.P.		
	.770	.776
I.P.	.731	.735
L.P.	.735	.735
Revolutions of air pumps	162	124.7
Revolutions of circulating pumps	344	369.1
Temperatures in degrees Fahrenheit, injection	60	60
discharge	102	105.5
hotwell		121.5
feed tank	130	106
Revolutions of blowers	470	475

Air pressure in fire rooms, average inches		2.04
H.P. cylinder, mean pressure	49.63	47.65
I.H.P.	2001	1903.2
I.P. cylinder, mean pressure	38.51	40.05
I.H.P.	3097.3	3185.6
L.P. cylinder, mean pressure	16.27	17.8
I.H.P.	3198.5	3463.4
Equivalent pressure on L.P. piston equal to aggregate M.E.P.	42.45	44.18
Collective I.H.P. of each main engine	8297.6	8552.2
I.H.P. of air pumps, separate	18.22	35.78
I.H.P. of circulating pumps, in pairs	66.5	65.2
Collective I.H.P. of air and circulating pumps	84.72	100.98
I.H.P. of air pumps combined		54.00
I.H.P. of circulating pumps combined		131.7
I.H.P. of main feed pumps (four)		44.7
I.H.P. of combined auxiliary air and circulating pumps		31.28
I.H.P. of eight blower engines		130.56
I.H.P. of water-service pump		7.14
I.H.P. of fire and bilge pumps		10.66
I.H.P. of engine-room auxiliary pumps		5.53
I.H.P. of hot-well (tank) pumps		17.96
I.H.P. of dynamo engines, two		29.75
Collective I.H.P. of all auxiliaries in use except main air and circulating pumps		277.58
Collective I.H.P. of each main engine, with its air and circulating pumps	8382.32	8653.18
Collective I.H.P. of both main engines, with main air and circulating pumps		17,035.50
Collective I.H.P. both main engines, with all auxiliaries		17,313.08

Starboard

Port

Kind and quality of coal		
Best Harris Steam Navigation		
Pounds per hour		37,937.5
Pounds per hour per I.H.P. , collective of all machinery in operation		2.19
Pounds per hour per I.H.P. , collective of main engines, main air and circulating pumps		2.22
Pounds per hour per square foot of heating surface		1.38
Pounds per hour per square foot of grate surface		44.7
Square feet of cooling surface per I.H.P.		1.152
Square feet of heating surface per I.H.P.		1.635
I.H.P. per square foot of grate		21.011
I.H.P. per square foot of screw area	122.02	125.77
Helicoidal area of both screws to immersed midships section		.1402

Ratio of disc area of both screws to immersed midships section	.3524	
Indicated thrust, pounds (I.H.P. main engines)	102,954.86	107,224.59
Indicated thrust per square inch of surface of thrust-bearing pounds	63.44	66.07
Weight of propelling machinery (water included), tons		1215.23
Weight of propelling machinery per I.H.P., pounds		157.23
I.H.P. per ton of machinery (maximum I.H.P.)		14.247
Slip of propellers, per cent	17.3	16.44

The data above given in relation to coal consumption were arrived at by the use of bagged coal for the eight furnaces in the after fire rooms, the bags containing 100 pounds each, and the rate thus reached was assumed as the mean rate for all the furnaces.

Reference to the tabulated performances will show a peculiar condition of affairs, in that the port engine developed 254.6 H.P. more than the starboard engine while averaging 1.45 revolutions less per minute. But a comparison of the equivalent mean pressures to develop the total horse-power in the L.P. cylinders shows it to be 42-45 pounds per square inch on the starboard side, and 44.18 pounds on the port side, from which the inference would seem to be that the port propeller is coarser in pitch than the starboard one. The very high equivalent pressure given above is worthy of note, comparing most favorably with that shown for recent ships.

[It is proper to state that the indicators used on this trial were not tested in the manner usual in such cases, or in trials for indicated horse-power, but by comparison with a standard spring pressure gauge which had been tested by the mercury column at the Mare Island Navy Yard. The method usually followed is described by, Assistant Engineer Conant, U.S. Navy, on page 322 of Volume III, of the Journal.-ED.]

APPENDIX B

Shipboard routine in the United States Navy as described in *The Bluejacket's Manual*, 1902 edition.

PORT ROUTINE

4:00 AM Call ship's cook (earlier if necessary).
4:45 Anchor watch trice up hammock cloths: call hammock stowers, boatswain's mate and music: mates of deck.
5:00 Reveille, call "All hands": fifteen minutes to clear deck of hammocks: coffee: light smoking lamp,
5:20 Pipe sweepers.
5:30 Turn to: clear up decks: execute morning orders and routine: hoist ashes: call warrant officers.
5:45 Market boat.
6:00 Day men report to the officer of the deck: side cleaners over the side.
6:30 Serve out fresh water: fill distributing tanks.
6:50 Trice up hammock cloths.
7:00 Up all hammocks.
7:20 Mess gear: light smoking lamp: coxswains report boats ready.
7:30 Breakfast: shift into the uniform of the day.
8:00 Colors: lower running boats.
8:15 Turn to-. bright-work: out smoking lamp: pipe sweepers: inspect running crews.
8:45 Sick call.
9:00 Spread awnings: flemish down gear.
9:15 Clear up decks for quarters: down towels and wash deck gear: pipe sweepers.
9:25 Officer's call: report decks ready for quarters.
9:30 Quarters. First drill period: inspection of berth deck, mess gear, and storerooms. When first drill period is over, reports and requests at mast. Extra-duty men to work when not at drill. Saturdays, weather permitting, up all bags.
10:30 Second drill, period.
11:00 Retreat from drill.
11:30 Inspect dinner: if still up and dry, down wash clothes: up ditty boxes: pipe sweepers.
11:45 Mess gear: light smoking lamp.
NOON Dinner (emergencies alone interfere with this).
1:00 P.M. Turn to: out smoking lamp: down ditty boxes: pipe sweepers: special requests to the executive officer.
1:30 Provision call: extra-duty men at work when not, at drill: drill call.
2:00 Drill retreat: pipe sweepers.
3:00 Pipe sweepers.
4:00 Knock off work: pipe sweepers.

4:30 Pipe sweepers: clear up for quarters: lay up gear.
4:55 Officers' call.
Quarters.
5:20 Spread mess gear.
5:30 Supper: shift into blue.
6:00 Turn to: pipe sweepers: coal and water steamers: fill
distributing tanks.
SUNSET Retreat: ceremony prescribed to be carefully observed. When
ceremony is ended hoist boats: up wash deck gear: see fire
hose coupled. Scrub clothes Sunday, Tuesday, and Thursday.
6:25 Wardroom dinner call.
7:30 Hammocks: lights in hold, orlop, and storerooms to be re-
ported out not later than 7:30. Mate of splinter deck see
that water-tight doors and hatches are closed for the
night.
8:00 Warrant officers and storeroom keepers report.
8:55 First call: out smoking lamp: down ditty boxes.
9:00 Tattoo: inspection of all decks, Silence. Muster anchor
watch. Pipe down. Taps.
10:00 Lights in wardroom and steerage to be extinguished.
SEA ROUTINE
3:00 AM Call ship's cook.
3:50 Call the watch: relieve the wheel and lookouts.
4:00 Relieve the watch: light smoking lamp.
4:30 Turn to: out smoking lamp: pipe sweepers: clear up the
decks: wash clothes.
5:00 Call idlers and day men.
5:15 Trice up clothes lines: execute morning orders.
SUNRISE Take in running lights: station masthead lookout.
6:30 Hoist ashes.
6:50 Trice up six bell hammock cloths.
7:00 Up all hammocks: serve out washing water.
7:20 Mess gear: watch below: light smoking lamp.
7:30 Breakfast: watch below: clean deck bright-work.
7:50 Mess gear: watch on deck.
8:00 Relieve the watch: breakfast.
8:30 Turn to: out smoking lamp: clean bright-work.
9:00 Sick call.
9:15 Clear up deck: down towel lines: stow away ditty boxes
and cleaning gear: pipe sweepers.
9:25 Officers' call. Report decks ready for quarters.
9:30 Quarters: after which drills and exercises as per
routine.
10:00 Relieve wheel and lookouts.
10:30 Retreat from drill: "Extra-duty call": pipe
sweepers: hoist ashes.
11:30 Clean up decks: pipe sweepers.
11:50 Mess gear: watch below: light smoking lamp.
NOON Dinner: watch below.
12:20 Mess gear: watch on deck.

12:30 Relieve the watch: dinner.
1:00 PM Turn to: out smoking lamp: pipe sweepers: start work
about the deck.
1:30 Serve out provisions: drill call.
2:00 Hoist ashes: relieve the wheel and lookout.
2:15 Retreat from drill: pipe sweepers: "Extra-duty call."
2:30 Instruction of landsmen: hoist ashes.
3:30 Pipe sweepers.
4:00 Relieve the watch.
4:30 Pipe sweepers: clear up decks: knock-off all work.
4:55 Officers' call.
5:00 Evening quarters: close watertight doors.
5:20 Mess gear: watch below: light smoking lamp.
5:30 Supper: watch below: pipe sweepers.
5:50 Mess gear: watch on deck.
6:00 Relieve watch: supper: relieve wheel and lookouts: life-
boats and life-buoys reported ready.
6:30 Turn to: pipe sweepers: hoist ashes.
SUNSET Set deck lookouts: running lights: get up wash deck gear.
7:30 Hammocks: mate of splinter-deck see water-tight doors and
hatches closed.
8:00 Relieve the watch, wheel and lookouts: out smoking lamp.
Warrant officers and store-room keepers report.

APPENDIX C

THE "BOUNDING BILLOW."

THE BATTLE OF MANILA BAY

THE U. S. FLEET GAINS A DECISIVE VICTORY OVER THE SPANIARDS - NOT
A MAN KILLED AMONG THE AMERICANS

Ships were sinking;
"Old Glory" flying;
Guns were roaring,
And Spaniards dying.

The U. S. Fleet, consisting of the "Olympia," (Flagship), "Boston," "Raleigh," "Baltimore," "Concord," "Petrel," "McCulloch," (Dispatch boat) and the transports "-Nanshan" and "Zafiro," (merchant steamers carrying coal for the fleet) left Mira Bay, China, April 27th, 1898, for Manilla, Philippine Islands, to engage the Spanish Fleet stationed there.

The ships made a very warlike and imposing picture as they steamed out of the harbor in three columns, with all colors flying, bent on their dire and fateful errand.

A looker on would have thought that the ships were merely going on a pleasure trip, judging by the happy and careless demeanor of the crew; but unless they have experienced it they would never guess the strain that the uncertainty of whether we were really going to war or not, had put on the nerves of these men who had almost nothing to divert their minds. Once the suspense was relieved however, and a definite move made, there was a complete change and they went about their different tasks as blithesome and gay as if it were an extended leave instead of grim war.

The second day out the following intellectual abortion was posted on the bulletin board. For arrogance and conceit it certainly caps the climax; as a sample of ignorance and idiocy it is unsurpassable.

Proclamation issued by the Governor-General of the Philippines; -SPANIARDS:

Between Spain and the United States of North America hostilities have broken out. The moment has arrived to prove to the world that we possess the spirit to conquer those who, pretending to be loyal friends, take advantage of our misfortune and abuse our

hospitality, using means which civilized nations count. unworthy and disreputable.

The North American people, constituted of all the social excrescences have exhausted our patience and provoked war with their perfidious machinations, with their acts of treachery, and with their outrage against the laws of nations and international treaty.

The struggle will be short and decisive. (It was.) The God of victories will give us one as complete as the righteousness and justice of our cause demands. Spain, which counts upon the sympathies of all the nations, will emerge triumphant from this new test, humiliating and blasting the adventurers from those States that, without cohesion and without a history, offer to humanity only infamous traditions and the spectacle of a Congress in which appear united, insolence and defamation, cowardice and cynicism.

A squadron manned by, foreigners, possessing neither instruction nor discipline, is preparing to come to this archipelago with the ruffianly intention of robbing us of all that means life, honor and liberty. Pretending to be inspired by a courage of which they are incapable, the North American seamen undertake as an enterprise capable of realization the substitution of Protestantism for the Catholic religion you profess, to treat you as tribes refractory to civilization, to take possession of your riches as if they were unacquainted with the rights of property, and to kidnap those persons whom they consider useful to man their ships or to be exploited in agricultural or industrial labor. Vain designs! Ridiculous boastings!

Your indomitable bravery will suffice to frustrate the attempt to carry them into realization. You will not consent that they shall profane the faith that you profess, that impious footsteps shall defile the temple of the true God nor that unbelief shall destroy the holy images which you adore. The aggressors shall not profane the tombs of your fathers, they shall not gratify their lustful passions at the cost of your wives' and daughters' honor, nor appropriate the property which your industry has accumulated to assure your livelihood. No, they shall not perpetrate any of those crimes inspired by their wickedness and covetousness (sic), because your valor and patriotism will suffice to punish and abase the people that, claiming to be civilized and cultivated, have exterminated the natives of North America instead of bringing to them the life of civilization and progress.

Filipinos, prepare for the struggle, and, united under the glorious flag of Spain, which is ever covered with laurels, let us fight with the conviction that victory will crown our efforts, and

to the summons of our enemies let us oppose with the decision of the Christian and the patriot the cry of "Viva Espana."

Your General,
BASILIO AUGUSTIN Y DAVILA

This unjust and cowardly manifesto aroused the anger and indignation of every man in the fleet, and many and deep were the growls and threats. The learned General would have fared badly had he been at hand. The following speech was made by the Editor (being the literary organ and representative), in answer to the foregoing proclamation.

Shipmates, you all, no doubt, have seen and read the rank and cowardly attack, made by the Spanish governor at Manila, on the Glorious Flag and Country we serve.

In it, he questions our bravery, our birthrights, the honesty of our government, and claims that we have no history! What do the acts of our forebears represent? What was the glorious fight they made for independence in the war of '76, when father and son left their plows in the furrow and shouldered their muskets for liberty, while wives, mothers and sweethearts cheered them on to victory? What was the war of 1812? The Mexican War? Even our Indian War? History all, and honorable, unstained history at that!

What does he mean by saying we are "a cowardly nation?" "Old Glory," the dear old Flag we serve and love, harbors no cowards. Wherever seen it is recognized as the emblem of freedom and honor, the standard of a nation of heroes, and though he may prate and proclaim from now until "hades freezes over," he will never make any but the most benighted or bigoted believe that he is even sane.

The sight of Our Flag is like a breath of pure fresh air. Its very colors are significant; the red is emblematic of the blood of heroes shed in the defense of our country; the white the purity of our aims and objects, and the star spangled blue, the Heaven we look to for guidance and strength.

Then this Spanish Solomon goes on to inform the brave muchachos under his sovereign command, that we are a gang of cut-throat Protestant heretics who will convert them "willy nilly" into a belief in our faith; that we are marauders and thieves; that we are the scourgings of the earth's gutters, "social excrescences" (soft impeachment), and lastly that we had veritably driven them on to war, manufacturing causes and insulting them because we knew, or rather, thought they were weak.

Shipmates, you all know what has brought on this war. The barbarous inhumanities practiced by them in the Island of Cuba,

right before our eyes; old men and women cruelly tortured and slain, babes murdered on their mother's breasts, thousands of peaceful homes ruined and destroyed by these Spanish fiends, the dear old Stars and Stripes trampled in the mud of Spanish streets, and last, worst of all, the tragedy that has been too lately, enacted to be forgotten, the destruction of the "Maine," when brothers, friends and shipmates were foully murdered through Spanish treachery and hatred, an act that has won for Spain the aversion of all civilized nations. These acts have brought on the war. Acts the wildest savage would disdain, crimes that none but the lowest of Lucifer's emissaries would commit. It is to avenge these wrongs, to, give blessed liberty to an oppressed and down-trodden nation, and to uphold the honor of our country, that we are going to war with Spain. The Governor says the Spanish flag is covered with laurels; perhaps, but they are laurels of infamy!

Fellow patriots, when the hour arrives we will one and all gladly lay down our lives for the dear flag and beloved country that has never had one stain to blemish the purity of its escutcheon. I know of no words that will appeal more forcibly to your hearts than those of the "Patriot Poet" Holmes, in the beautiful poem,-

"The Flower of Freedom."

What flower is this that greets the morn,
Its hues from Heaven so freshly born;
With burning star and flaming brand
It kindles all the sunset land,
O! tell me what its name may be?
It is the "Flower of Liberty!"
Behold its streaming rays unite.
One mingling flood of braided light,
The red that fires the southern rose
With spotless white, from northern snows
While spangled o'er its azure, see
The sister stars of liberty!
The blades of heroes fence it round,
Where e'er it springs is holy ground,
It makes the land, as ocean free,
And plants an empire on the sea.
Thy sacred folds, fair freedom's flower,
Shall ever float from dome and tower,
To all their heavenly colors true
In blackening frost or crimson dew,
O! land where thy banners wave last in the sun,
Blazoned with star clusters, many in one!
Waving o'er mountain and prairie and sea
Hark! 'tis the voice of thy children to thee;
Here at thine altar our vows we

E'er in thy cause to be loyal and true;
True to thy flag on the field and the wave,
Living to honor it; dying to save.
Flag of the heroes who left us their glory.
Bourne through their battle field's thunder and flame,
Blazoned in song and illumined in story,
Waves o'er us all, who inherit their fame.
Light of our firmament, guide of our nation,
Pride of her children and honored afar,
E'er the bright beams of thy full constellation,
Shall scatter each cloud that would darken a star.
Yet if by madness or treachery blighted.
Dawns the dark hour when the sword thou must draw,
Then with the arms of thy millions united,
Smite the bold traitors to freedom and law.
Lord of the Universe shield us and guide us,
Trusting thee always, through shadow and sun.
Thou hast united us; who shall divide us!
Keep us! O keep us! the "Many in One"
Up with our banner bright,
Spangled with starry light
Spread its fair emblems from mountain to shore
While thro' the sounding sky,
Loud rings the nations cry,
Union and Liberty! One evermore!"

And now shipmates, when we get to Manila and meet the Spanish
murderers, let our battle cry be,-

*Remember the "Maine"
And down with Spain*

About two o'clock Saturday morning land was sighted, and at
day-light we were close on the coast of the enemy's country.

We kept about five or six miles from the coast line, keeping
a bright look-out for men-o'-war or other craft of the enemy.
During the morning the "Boston" and "Concord" were sent ahead to
reconnoitre Subig Bay, as it was rumored that there were two men-
o'-war there. Later we sighted a couple of
fishing schooners. The transport "Zaffiro" was sent to board one.
They informed the officer that there were only two gunboats in
Manila Harbor. We knew they were lying, but allowed them to proceed
without further molestation.

In the afternoon the light house on Cape Bolinao, was sighted,
and the "Baltimore" was sent ahead to reconnoitre.

When the fleet reached Subig Bay the "Baltimore" was close in to shore while the "Boston" and "Concord" were standing out toward us. They had seen nothing of the enemy. The fleet then formed in column again and proceeded to Manila.

It was Commodore Dewey's intention to pass the large fort on Corregidor Island, 26 miles from Manila, about midnight if possible, without being seen. It was a bold move, and certainly deserved the success that crowned it, for there was great danger of mines and torpedoes being placed in the entrance to say nothing of the guns in the forts. The harbor had in fact been considered impregnable, and no doubt it was, but not against Yankee wit and daring. At about midnight we were standing up Manila Bay at a speed of four knots. We were in hopes that the moon would go down as her light was rather annoying to our hopes of entering undiscovered, but she seemed determined to stay out and see the fun. The guns were all manned and kept trained on the forts, while eyes and ears were strained watching and waiting for the shot that would indicate our discovery. Corregidor fort was on our left, while another battery somewhat further in was on our right hand.

On board the ships -everything was quiet and nothing could be heard but the officers giving the range in whispers and the monotonous swish, swish, of the water. The strain was terrible, and not one of the men that manned that fleet will ever forget the morning of the "First of May."

Suddenly a flash of light was seen on the fort on Corregidor. The men hold their breath waiting the report, but it was only a rocket. Soon another goes up, a light on shore flashes out signals, another on the other side, and we know we were seen. It is afterward rumored that two torpedoes had been fired at us, but they did not have range enough to reach us.

At seventeen minutes past twelve the battery on our right opened fire, the shell passing between the "Olympia" and "Baltimore." The "Raleigh" answered immediately. Another shot between the "Concord" and "Boston" was answered by the latter and the "McCulloch." The "McCulloch" then turned back to look after the transports. The Flagship signalled to the "McCulloch," "are you all right?" "McCulloch" answered "O.K!" It was too dark for the "Boston" and "Raleigh" to locate the batteries, so they ceased firing. None of the ships were struck.

About 3.20 word was passed to "lay by your guns and take it easy.." Some of the men "lay" but "taking it easy was out of the question. The decks were sprinkled with sand, and it would get into eyes, ears, nose, and scratch the skin and some one would stroll over your recumbent form, as leisurely as if on parade, for all lights were out and the decks were as dark as Erebus. At four

o'clock coffee was served out, and the stillness was broken by the clashing of bowls and the merry laughter occasioned by collisions in the dark. Everybody was as happy as though on an excursion, jokes and witty stories were going the rounds, while every once in a while some *pensive nightingale* would strike up the affecting song "Just Before the Battle, Mother," until some one spilled a bowl of hot "bootleg," over him and quieted him for a few minutes.

The men were all in "war-clothes" (which consisted of almost nothing) and despite the joking and laughing the determined gleam in their eyes showed that they meant business and were there to "do or die."

We were standing in toward the city to reconnoitre. Several foreign sailing vessels were laying off Manila but no men-o'-war could be seen. At twelve minutes to five we broke "Old Glory" at the mast heads and gaff and were saluted with a ten inch shell from a battery on the south bastion of the city. This battery kept up a continual fire, but all shots fell short, We did not return their fire but headed in for the Navy Yard at Cavite.

The Spanish fleet was sighted at seven minutes to five. They were lying in line from Sangley Point to Las Pinas across Cavite and Canacao Bays. Their right flank was protected by Cavite peninsula on which was mounted a very heavy battery. The left flank reached to the shoal part of the Bay near Las Pinas.

The, Spanish vessels were further protected by a huge boom covered with chains, lighters filled with stones and water, covering the water lines.

The "Reina Cristina " was standing off the left flank of the line, and had the Spanish Rear Admiral Montojo y Pasaron on board.

At 5:35 the ball was opened by the batteries on Sangley Point and a shell fell, near the "Olympia." The American fleet then advanced to the attack, flagship leading. Commodore Dewey personally directed the movements of the squadron from the forward bridge. The Captain directed the firing, while the Captains in command of the other vessels handled their respective ships with a dexterity that was little short of marvelous.

At 5:38 the "Reina Cristina" opened fire, followed by the rest of the Spanish fleet. At 5:55 the American fleet began firing and a rapid fire was kept up by the entire fleet during the engagement. A torpedo boat came out about ten minutes past six and endeavored to place itself in the track of the "Olympia" but was driven ashore by the rapid fire guns. Another boat came out and fired a torpedo which passed across the bow of the "McCulloch" but did no damage. Before the boat could escape it was struck by so many shots that

nothing was left of it but smoke. There were several torpedo attacks made on the other vessels but luckily all were effectually repulsed or blown up. This was mainly due to the good marksmanship of the "men behind the guns."

The American fleet steamed along the entire length of the Spanish line at distances varying from 5000 to 1500 yards. The order was given to fire on the arsenal in Cavite and a well directed shot from an eight inch gun sent it up in smoke. This was at 6:45 and our fleet had just made the first round. We passed the line of ships and forts five times, three times from the eastward and twice from the westward. On the second round from the westward the Span. sh Admiral made a desperate effort to get outside the boom but received a concentrated fire from the fleet. His ship caught fire and he transferred to the "Isla de Cuba" first hauling down the colors on the "Reina Cristina." The American ships then stopped firing at the latter and kept a continual storm of steel raining on the enemy's other ships and forts.

The "Don Antonio de Ulloa" also made a desperate but futile attempt to get out, She went down with her colors flying at her peak until the "Petrel" lowered a boat, and cut them away. The flag was presented to Commodore Dewey. In the meantime the Spanish Admiral returned to the "Reina Cristina," the "Isla de Cuba" being in a sinking condition. The Spaniards fought very courageously, many of them going down fighting their guns until the last. Even amidst the horrors and cruelties of war, one cannot help remarking and admiring the valor of these heroes, Spaniards and enemies though they be.

It was on this round that the "Boston" stood like a fort for ten minutes firing as fast as it could load and aim, receiving the concentrated fire of all the Spanish ships.

The "Olympia" was twice hulled but the shells did not penetrate sufficiently to do much damage. Although shot and shell rained thick around her she was struck but eight times and miraculous though it may be, not a man was injured. The other ships in the fleet thought the Flagship was sinking, for all that could be seen of her was a cloud of smoke and jets of flame bursting through.

One shot struck the "Baltimore" in the starboard waist just abaft one of the 6 inch guns. It passed through the hammock netting, exploding a couple of 3 pdr. shells, wounding six men, then across the deck striking the cylinder of a gun, making it temporarily useless, then running around the shield it spent itself between two ventilators just forward of the engine room hatch. The shell is in possession of the Captain. The other vessels also,

with the exception of the "Concord and "Petrel" were struck several times.

At about half past seven the Spanish fire slackened. The "Reina Cristina" was on fire and sinking, the "Castilla" was sunk, and many others were afire and crippled. The fort on the mole at Pasig River had ceased firing.

At 7:56 we stood off shore for the middle of the bay, while the batteries in the forts on Sangley point along the beach off Cavite and on the south bastion of Manila kept up a continuous but ineffective fire.

The crews had breakfast and a rest which they certainly needed, though they were every one anxious to continue and have it out.

The batteries on Cavite kept up a continual fire, but the range was too long and they did no further damage except to waste their ammunition.

A conference of Commanders was held on board the Flagship and at 10:15 the fleet stood in to silence the batteries. The "Baltimore" led, "Olympia" followed close behind while the "Raleigh" and "Boston" formed on the right flank. The "Concord" and "Petrel" diverged to the left and maneuvered to get behind the point on which the forts were situated. The two leading vessels steamed in bows on and when about 1500 yards from the batteries opened fire with their large guns. As the "Boston" and "Raleigh" came up the Flagship drew back while the Baltimore "remained stationery delivering shot after shot with such telling effect that in twenty minutes she silenced the two most dangerous guns.

The "Boston" and "Raleigh" steamed along the point delivering broadsides as they went at the remaining fort on Sangley point. In the meantime the brave little battle-ships "Petrel" and "Concord" steamed in behind the point and attacked the forts from the rear utterly demolishing the Spaniards. The "Concord" fired a few shots at the transport "Mindanao" which had been run on the shoals off Las Pinas, and after being assured that there was no life on board set the vessel on fire.

At twenty minutes past twelve a white flag went up near Cavite and the bombardment ceased. The "Petrel" was sent up the Ciran River to destroy the gunboats that had retreated there.

The "Boston" and "Concord" remained off the Navy Yard while the rest of the fleet proceeded to the city to silence the fort there, that had been so persistent in making itself heard. Just as we got in range they ran up the "white flag" and when the sun set

that night it's last rays rested like a benediction on "Old Glory" waving proudly from mast head and peak of Uncle Sam's doughty arbitrators.

Superior tactical knowledge and calm calculations, superior gunnery and coolness together with Yankee daring, won the day.

The next day the "Petrel" went into the bay and brought out a number of steam launches, two tugs and a couple of small boats, which were distributed among the fleet.

The surrender of all the vessels of war, forts, and arsenals in the bay was demanded and given. The surrender of the city was delayed until the authorities at Washington were heard from.

Apothecaries, nurses, and detachments of men were sent on shore to assist in caring for and transporting the wounded to the hospitals, and burying the dead.

The effect of our deadly fusillade was simply frightful, the dead and wounded strewing the ground and buildings like leaves in autumn.

One of the wounded from the "Reina Cristina" could speak very good English, having been in America some time, but on returning to his native land on a visit had been impressed into the service. He had both legs shot away;- He stated that nearly all the vessels had double crews, many of them being volunteers from among the citizens and that the number of deaths would never be known. He also said that no sooner had a gun been loaded than a storm of projectiles would sweep away the gun's crew. At the time the Spanish Admiral tried to get his ship out he received such a terrible fire that the deck was one mass of bursting shell. The captain, he said, was killed almost at the first discharge.

THE SPANISH FLEET CONSISTED OF THE FOLLOWING NAMED VESSELS

*	"Reina Cristina" (Flagship)	Cruiser	
**	"Castilla"	"	
*	"Don Antonio de Ulloa"	"	
*	Don Juan de Austria"	"	
*	Isla de Cuba"	"	
**	"Isla de Luzon"	"	
*	"General Lezo"	Gunboat	
*	"Marquis del Ducro"	"	
**	"Elcano"	"	
*	"Velasco"	"	
*	"Argus"	"	
**	"Isla de Mindanao"	Transport	"Manila"

Vessels sunk are marked thus (*).
Vessels burnt are marked thus (**).

The Luzon, Cuba, Duero, Lezo, Austria and Eleano are sunk in the mouth of Cinar River.

The transport "Manila," the armed tug "Barcelo" with a large quantity of appurtenances for laying mines, and several other armed tugs and launches were captured.

Since the day of the engagement the American fleet have been busy destroying fortifications and ammunition, and disarming the hulks of the Spanish ships.

An amusing incident which occurred during the heat of the engagement will show what an utter disregard the men had for the seriousness of the occasion. It was on board the "Raleigh." Two shellmen, both fair amateur musicians, would snatch moments between hustling ammunition to take, one the guitar, the other a violin, and strike up the inspiring tune "There'll be a Hot Time in the Old Town To-night" while even the Captain could not refrain from laughing at the ludicrousness of the scene.

That night the scene was awful but grand. The blaze from the burning vessels threw a lurid glare over the rack and ruin ashore and the wrecks afloat while occasionally a magazine would burst, like the eruption of a volcano, throwing its flaming debris high into the air, making a lurid picture of the horrors of modern warfare, which made a life-long impression on all who saw it.

Source: L.S. Young, ed., The Bounding Billow, Published at intervals aboard the *USS Olympia*, 1895-98. Bound volume located at the Naval History Center, Washington Navy Yard, Washington D.C.

APPENDIX D

PHOTOGRAPHS OF ACTIVITIES ABOARD THE U.S.S. OLYMPIA

The Frances Benjamin Johnston Collection - Library of Congress;
Prints and Photographs Division

Title: People and activities aboard the *U.S.S. Olympia*

Call Number: LOT 8868 (G) <P&P>

Creator: Johnston, Frances Benjamin, 1864-1952, photographer.

Note: The collection is on 5 x 7 glass plate negatives and gives insight into daily shipboard life. The collection is dated 1899. The collection is dated 1899 and a note mentions that the photos were taken while Johnston was on assignment for George Grantham Bain while Dewey's ship was in Naples during its tour of European ports. The official ship's history on the *Olympia* from the Naval Historical Center is not too detailed. It states: "*Olympia* remained in the Philippines until 20 May 1899 assisting in the blockade and capture of Manila, and aiding the army in repelling the attacks of the natives. She arrived at Hong Kong on 23 May 1899, and on 6 June 1899 departed China for her return to the United States, via Suez and the Mediterranean. Arriving at Boston 10 October 1899, she went out of commission in reserve on 8 November 1899. So the probable dates for the photographs in Naples were during the months of July and August 1899. Examination of the ship's logbooks could pinpoint the exact days *Olympia* was in Naples.

There are 241 photoprints of which 151 are silver gelatin on glass, excellent quality and will reproduce satisfactorily. Of the 151, about 61 are directly concerned with shipboard activities on the *Olympia* while the remainder depict life at the Naval Academy, parades and other naval activities. The rest are cyanotypes or albumin prints and not suitable for first quality reproduction. The cyanotypes are mostly duplicates of the silver gelatin prints.

Another note mentions that more information on Johnston and this work might be found in *A Talent for Detail*, a biography on Johnston by Pete Daniel and Raymond Smock. New York: Harmony Books, 1974.

LIST OF PHOTOGRAPHS OF ACTIVITIES ABOARD THE U.S.S. OLYMPIA

Library of Congress Number	Subject
LC-J698-61251	U.S.S. OLYMPIA - 24 MARCH 1895
LC-J698-61254	OLYMPIA'S BAND AND CEREMONY ON DECK
LC-J698-61257	ADMIRAL DEWEY'S QUARTERS
LC-J698-61259	ADMIRAL DEWEY'S QUARTERS
LC-J698-61260	PORTRAIT OF ADMIRAL DEWEY
LC-J698-61263	ADMIRAL DEWEY IN HIS QUARTERS
LC-J698-61265	ADMIRAL DEWEY AND HIS PET DOG
LC-J698-61267	ADMIRAL DEWEY AT A SHIPBOARD BAND CONCERT
LC-J698-61269	ADMIRAL DEWEY AND TWO OFFICERS (PROBABLY ITALIAN NAVY)
LC-J698-61271	GROUP OF OFFICERS
LC-J698-61272	GROUP OF OFFICERS
LC-J698-61273	ENGINEERING OFFICERS ON CATWALK ABOVE ENGINE ROOM
LC-J698-61274	GROUP OF SEATED OFFICERS
LC-J698-61275	PORTRAIT OF A SHIP'S OFFICER
LC-J698-61278	TWO OFFICERS AND A LADY VISITOR
LC-J698-61279	PORTRAIT OF ONE OF OLYMPIA'S HELMSMEN
LC-J698-61281	PORTRAIT OF A SAILOR
LC-J698-61282	PORTRAIT OF A SAILOR WITH PET PARROT
LC-J698-61284	PORTRAIT OF OLYMPIA'S BUGLER
LC-J698-61285	PORTRAIT OF OLYMPIA'S BUGLER
LC-J698-61286	ARMS LOCKER

Library of Congress Number	Subject
LC-J698-61287	PORTRAIT OF A SAILOR
LC-J698-61288	SAILOR STANDING BY OPEN BREECH OF GUN
LC-J698-61289	SAILOR STANDING BY GUN
LC-J698-61290	DETAIL OF ONE OF OLYMPIA'S GUNS
LC-J698-61291	SAILORS BELOW DECK
LC-J698-61293	SAILOR WITH A TELESCOPE
LC-J698-61294	VIEW OF OFFICER ON DECK USING TELESCOPE
LC-J698-61295	PORTRAIT OF THREE SAILORS
LC-J698-61299	CHINESE COOKS ON THE OLYMPIA
LC-J698-61300	SAILORS USING SMOKING LAMP
LC-J698-61302	SAILORS WRITING LETTERS AND READING
LC-J698-61303	PORTRAIT OF A BOATSWAINS MATE
LC-J698-61304	SAILORS STANDING AT FORWARD GUN TURRET
LC-J698-61307	SAILORS PERFORMING MAINTENANCE ON GUN
LC-J698-61308	GUNNERY DRILL ABOARD THE OLYMPIA
LC-J698-61309	TORPEDO CREW
LC-J698-61311	GROUP OF SAILORS AT GUN
LC-J698-61312	VIEW OF CREW'S BERTHING SPACE
LC-J698-61314	SHIPBOARD BARBER SHOP
LC-J698-61316	GROUP PORTRAIT OF SAILORS
LC-J698-61319	CREW'S MESS
LC-J698-61321	SAILORS WASHING CLOTHES
LC-J698-61323	USING A FID - SPLICING ROPE
LC-J698-61326	SAILORS STANDING INSPECTION

Library of Congress Number	Subject
LC-J698-61327	SAILOR BEING TATTOOED
LC-J698-61328	SAILOR BEING TATTOOED
LC-J698-61329	SAILORS AND VENDOR
LC-J698-61331	SAILORS BEING PHOTOGRAPHED
LC-J698-61332	SAILORS AND VENDORS
LC-J698-61333	GROUP OF SAILORS WITH DUFFLE BAGS
LC-J698-61335	FENCING DRILL
LC-J698-61341	SAILORS SEWING - A SHIPBOARD TAILOR SHOP
LC-J698-61342	GROUP OF SAILORS WITH A PET KITTEN
LC-J698-61346	GROUP OF SAILORS GAMBLING ON DECK
LC-J698-61347	MAIL CALL
LC-J698-61351	PORTRAIT OF A GROUP OF SAILORS
LC-J698-61353	GROUP OF PETTY OFFICERS
LC-J698-61528	FOUR LADY VISITORS ON DECK
LC-USZ62-77906	SAILORS DANCING (WALTZING AT TIFFIN TIME)
LC-US262-86100	PORTRAIT OF AN OLD SALT

APPENDIX E

HISTORY OF USS OLYMPIA (IX-40)

OLYMPIA (C-6), a protected cruiser, was built at Union Iron Works, San Francisco, California. She was authorized on September 7, 1888, and her keel was laid June 17, 1891. She was launched November 5, 1892, and sponsored by Miss Anna Belle Dickie, daughter of an official of the building yard. The ship was commissioned February 5, 1895, Captain J.J. Read in command.

Her dimensions are:

Length overall	344 feet, 1 inch
Breadth on waterline	53 feet
Normal displacement	5870 tons
speed	21.69 knots
Armament	4 - 8", 10 5"/51, 6 - 18" torpedo tubes
Complement	34 officers 378 men

OLYMPIA departed Mare Island on August 25, 1895 to join the Asiatic Fleet as flagship of Rear Admiral F.V. McNair. Between 1895 and 1898 she cruised in the Far Eastern waters, visiting Japan, China, and the Sandwich Islands. On January 3, 1898 she became the flagship of Commodore George Dewey. During the winter of 1898, OLYMPIA remained at Hong Kong with the rest of the squadron, awaiting orders to proceed to the Philippines in the event that war was declared on Spain. On April 25, 1898, on request of the Governor of Hong Kong, the squadron proceeded to Mirs Bay, China, to await further orders. The orders were not long in arriving and on April 27, 1898 OLYMPIA and the Asiatic squadron got underway for the Philippine Islands. The darkened squadron stole past the batteries on Corregidor and arrived off Manila at daybreak on the morning of May 1, 1898. They immediately engaged the Spanish forces. Admiral Dewey in his autobiography, recounts:

"At 5:40 a.m. when we were within a distance of 5,000 yards, I turned to Captain Gridley and said 'You may fire when you are ready Gridley'. While I remained on the bridge with Lamberton, Brumby and Stickney, Gridley took his station in the conning tower and gave the order to the battery. The very first gun to speak was an 8-inch from the forward turret of the OLYMPIA, and this was the signal for all the other ships to join in the action." The action lasted from 5:41 (with an interruption of three hours) until 10:30 p.m. and ended in the destruction of Spain's Philippine fleet. On May 7, 1898 Dewey was promoted to the flag rank of rear-admiral in recognition of his splendid achievement at Manila Bay.

OLYMPIA remained in the Philippines until May 20, 1899 assisting in the blockade and capture of Manila and aiding the army in repelling the attacks of the natives. She arrived at Hong Kong on May 23, 1899, and on June 6, 1899 departed China for her return to the United States, via Suez and the Mediterranean. Arriving at Boston October 10, 1899, she went out of commission in reserve on November 8, 1899.

OLYMPIA underwent general repairs during 1901, and was Recommissioned in January 1902. She reported to the north Atlantic squadron on April 4, and was assigned as flagship for the newly formed Caribbean division of the North Atlantic Station. Between December 1903 and December 1905 OLYMPIA protected American interests at: Panama (December 1903 - March 1904); Tangier, Morocco (June 1904); Smyrna, Turkey (August 1904); and in Dominican waters (May - December 1905).

OLYMPIA was placed out of commission in reserve on April 2, 1906, at Norfolk. She was recommissioned May 15, 1907 and cruised with the midshipman along the East coast until August 25, 1907. She was again placed out of commission in reserve, at Annapolis, on August 26, 1907.

OLYMPIA was in commission during from June 1 to September 1, 1908 and May 14 to August 28, 1909 for the annual midshipman cruises. She remained at Annapolis, in reserve until March 2, 1912, when she sailed for Charleston, South Carolina, arriving March 6, 1912, for service as barracks ship for the personnel of the reserve torpedo group.

Rearmed with 12 4"/40 guns and recommissioned on October 30, 1916 OLYMPIA joined the Atlantic Fleet.

When war was declared April 6, 1917 the OLYMPIA was en route from Saint Thomas, Virgin Islands to Navy Yard Norfolk, Virginia.

On April 13th sailed as Flagship of the Patrol Force from Tompkinsville to Staten Island.

April 1917 - March 1918 under repairs;

She was designated flagship of the Patrol Force, Rear Admiral Henry B. Wilson, on April 13, 1917 and patrolled off New York. While on route from Tompkinsville to Gardner's Bay, Long Island, for target practice she struck bottom on the port side near Cerberus Shoal. The vessel began to list to port and it was decided to run the ship into shoal water and beach her - which was done. The vessel was later salvaged and towed to Nepeague Bay, Long Island, and later towed to the Navy Yard, New York, and entered dry dock July 13, 1917.

September 6, 1917 - Captain Waldo Evans was detached and command turned over to Lieutenant George P. Brown, Executive Officer.

October 15, 1917 - Captain Bion B. Bierer reported on board and assumed command.

February 4, 1918 - The OLYMPIA moved to Tompkinsville, N.Y. During repairs her 12 four-inch guns were replaced with 10 modern five inch guns. A submarine signalling apparatus was installed.

February 6, 1918 - Sailed in obedience to secret orders on convoy and patrol duty off Halifax, Nova Scotia.

February 9, 1918 - Arrived at Halifax, N.S. where orders were received to proceed to the assistance of the U.S.S. HATTERAS in distress. Later word was received that the HATTERAS did not need assistance. Steamers CLARANE and CLARA also reported in distress but both steamers were otherwise provided for and the OLYMPIA Returned to Tompkinsville, arriving February 17, 1918.

March 12, 1918 - Left Tompkinsville on convoy duty.

March 23, 1918 - Turned convoy over to Destroyer Escort and arrived at Hampton Roads April 4, 1918.

April 15, 1918 - Arrived at Charleston, South Carolina and entered dry dock to prepare for service in northern waters. All kinds of workmen swarmed aboard for the purpose of making necessary repairs as quickly as possible.

She sailed on April 28, 1918

May 13, 1918 - Arrived at Scapa Flow, Orkney Islands, Scotland.

May 20, 1918 - Left Scapa Flow at 4:13 a.m.

Arrived at Murmansk, Russia on May 24, 1918 at 10:52 p.m. OLYMPIA remained in northern Russian waters until November 8, 1918, as part of an Allied force protecting military supplies from the Germans and cooperating with the anti-Bolsheviks. During her stay OLYMPIA landed 108 men on 8 June to garrison Murmansk and contributed 54 men to the Allied expedition which recaptured Archangel. She served as flagship of Rear Admiral Newton A. McCully, Commander U.S. Naval Forces in Northern Russia between October 26 and November 6, 1918.

October 30, 1918 - Log mentions call of Captain of the American S.S. ASCUTNEY also call returned by Commanding Officer.

November 2, 1918 - Log mentions presence of American Merchant Ship ASCUTNEY and the S.S. WEST GAMBO.

Following repairs at Portsmouth, England between November 28 and December 26, 1918, OLYMPIA steamed to Gibraltar. She embarked Rear Admiral Albert P. Niblack, Commander U.S. Naval Forces Eastern Mediterranean on January 10, 1919 and proceeded to Spalato, Dalmatia. After cruising in Adriatic waters from January 21 until August 18 OLYMPIA visited Constantinople, the Black Sea Ports and Smyrna, Turkey. She returned to Spalato on September 19. Continuing her policing of the disputed Dalmatian coast, OLYMPIA put ashore a landing party of 101 men at Trau on September 23 to prevent a clash between the Yugoslavs and renegade Italian troops. She left the Adriatic on October 25 and returned home, arriving at Charleston,, South Carolina, on November 24, 1919.

February 1918 - Patrol duty off the coast of Nova Scotia.
Ocean escort for British Merchant vessels en route to and from New York from the War Zone.

Left Charleston April 28, 1918 for England.

Left Scarpa Flow May 20, 1918 at 4:13 a.m. - arrived Murmansk, Russia May 24, 1918 at 10:52 p.m.

May 19, 1918 - Underway for Russia.

May 24, 1918 - Arrived and anchored in the harbor of Murmansk, Russia.

June 8, 1918 - At 4.40 p.m. in obedience To orders issued by Rear Admiral Kemp, Royal Navy, Senior Naval Officer Afloat, eight officers and one hundred men, with full equipment, under command of Lieutenant Floyd, U.S.N. were landed at Murmansk. This small contingent constituted the second, if not the first, armed American forces to land in Russia during the World War. Owing to the fact that the British -forces had not moved out of the barracks which the American forces were to occupy the American contingent returned to the ship at 7:19 p.m. However, the next day they were put ashore in Murmansk where they were to assist in preserving order and to offer such resistance as should become possible to the Germans and Finns.

October 24, 1918 - The French Cruiser GUEYDON arrived at Murmansk from France. Rear Admiral Newton A. McCully, U.S.N. arrived on the GUEYDON and at 4:03 p.m. this date Rear Admiral McCully, U.S.N. assumed command of the U.S. Naval Forces in Northern Russia, hoisting his flag on board the OLYMPIA.

Left Murmansk October 26, 1918, 1:00 p.m.

Arrived Archangel October 28, 1918 at 7:52 a.m., anchored.

November 6, 1918 - Rear Admiral McCully left the ship and took up quarters in Archangel. Six men were sent ashore for duty with the Flag and three for duty ashore in Archangel with Lieutenant Riis, U.S.N.R.F.

Left Archangel November 8, 1918 at 7:26 a.m., bound for Murmansk.

Arrived Murmansk November 11, 1918. Anchored 8:23 a.m.

Left Murmansk November 13, 1918 at 7.00 a.m.

Arrived Invergordon, Scotland, November 18, 1918, 12:10 p.m, Moored to dock. Thence to Portsmouth, England.

Arrived at Portsmouth, England, November 28, 1918 and entered dry dock for repairs.

December 26, 1918 - Proceeded to Gibraltar, arriving Dec. 31, 1918.

January 10, 1919 The flag of Rear Admiral A.P. Niblack was hoisted on the OLYMPIA at 3:50 p.m. At 3:55 p.m. Rear Admiral Niblack embarked as a passenger on the OLYMPIA for Venice, Italy.

January 15, 1919 - Arrived at Valetta, Malta.

January 16, 1919 - Sailed for Brindisi, Italy, where instructions were received for navigating the mine fields just outside the harbor of Venice, also routing instructions for Fiume, Austria.

January 21, 1919 - Arrived and anchored at Venice, Italy.

January 22, 1919 - Captain Bion B. Bierer, U.S.N. relieved as Commanding Officer and Captain D.F. Boyd, U.S.N. assumed command. Rear Admiral Albert P. Niblack assumed command of the U.S. Naval Forces operating in the Eastern Mediterranean.

February 21, 1919 - Rear Admiral A.P. Niblack, Commander U.S. Naval Forces Operating in Eastern Mediterranean, left the OLYMPIA taking passage on the U.S.S. MAURY to Pola. OLYMPIA sailed for Spalato, Dalmatia, and arrived next day and came to anchor in Cavale Castelli between the two interned Austrian Battleships RADETZSKY and ZRINYI.

February 23, 1919 - U.S.S. MAURY arrived flying flag of Rear Admiral Niblack. Flag Lieutenant returned on board the OLYMPIA.

February 25, 1919 - Lieutenant Commander S. Field, left OLYMPIA to assume the duties as Chief Officer of the Inter-Allied Patrol ashore at Spalato. A Patrol Force of twelve men also left the ship equipped with rifles and ammunition, Lieut. Henry F. Floyd, U.S.N.,

in charge, to cooperate with other sections of the Inter-Allied Patrol in the matter of maintaining tranquility ashore in Spalato.

March 16, 1919 - Sailed for Brindisi, Italy, arriving next day and coaled, returning to Spalato, March 20th.

March 26, 1919 - In accordance with orders from the Secretary of the Navy, Rear Admiral A.P. Niblack, U.S.N., was relieved as Commander, U.S. Naval Forces Operating in the Eastern Mediterranean by Rear Admiral Philip Andrews, U.S.N.

April 5, 1919 U.S.S. STRIBLING broke Rear Admiral's flag and OLYMPIA hauled down Rear Admiral's flag.

April 19, 1919 - Commander of U.S. Naval Forces, Eastern Mediterranean, came aboard and OLYMPIA broke Rear Admiral's flag at main.

July 10, 1919 - Underway for Fiume, Croatia, arriving next day.

July 19, 1919 - Commander, U.S. Naval Forces, Eastern Mediterranean, transferred his flag to the U.S.S. PITTSBURG.

July 20, 1919 - Underway for Spalato, Dalmatia, arriving next day.

August 18, 1919 - In accordance with orders from Commander of U.S. Naval Forces, Eastern Mediterranean, got underway for Constantinople, Turkey, and arrived there August 23.

August 26, 1919 - Began cruise of the Black Sea, shopping at Batum, Russia; Trebizond, Turkey; Kerasunt, Turkey; Unich, Turkey, where American refugees were taken aboard for passage to Samsun, Turkey; Sinub, Turkey; Ineboli, Turkey; Sungal, Turkey, and returned to Constantinople September 8, 1919.

September 13, 1919 - Underway for Smyrna, Turkey, and arrived next day.

September 16, 1919 - Underway for Spalato, Dalmatia, arriving the 19th.

September 23, 1919 - Underway for Trau, Dalmatia, having been informed by ITALIAN SENIOR NAVAL OFFICER PRESENT of the occupation of Trau by renegade Italian troops from the Italian Occupied Zone, which he urged the United States Naval Authorities to induce to return to the Italian Zone prior to an inevitable clash of arms with the Serbian Military Authorities. Arriving at Trau disembarked a landing force of 101 men and officers all lightly equipped. The mission having been accomplished, the landing force "returned to the ship which returned to Spalato the same evening.

September 27, 1919 - Underway for Trau where she arrived same day and remained until October 25th when she sailed for Valetta, Malta, and arrived on October 28, 1919 and on October 29th entered dry dock.

November 1, 1919 - Came out of dry dock, sailed for Gibraltar and arrived November 5th.

November 9, 1919 - Sailed for Charleston, S.C. arriving November 24, 1919.

December 15, 1919 - Captain David P. Boyd, U.S.N., relieved of Command by Lieut. Commander C. B. Platt, U.S.N., Executive Officer.

January 6, 1920 - Captain Henry L. Wyman., U.S.N. assumed command, relieving Lieut. Commander C. B. Platt.

February 14, 1920 - Underway for New York and arrived February 17th.

March 22, 1920 - Underway for Gibraltar arriving April 5th.

April 8, 1920 - Underway for Spalato, Dalmatia, arriving April 14th.

From April 1920 until May 1921 the OLYMPIA was Flagship of the U.S. Naval Forces in the Adriatic. During this time she cruised in the Adriatic, her principal ports of call being Spalato, Dalmatia and Venice, Italy. Other ports she visited were Pola, Italy; Ragusa, Dalmatia, Malta and Naples, Italy. In December 1920, while en route from Spalato to Venice she received orders to proceed immediately to the Black Sea assist in the evacuation of the Russian refugees who were being driven out of the Crimea by the Bolsheviki upon Wrangel's defeat, when she was rounding the southern coast of Greece orders were received directing her return to Venice as the evacuation had been completed. Shortly after her arrival at Venice orders were received directing her to proceed to Ragusa, Dalmatia, to assist in caring for refugees who had been landed there and were in desperate circumstances due to hunger, lack of shelter and the outbreak of smallpox and typhus. At Ragusa about 2500 refugees were cared for. The ship provided fuel for heating and cooking, soap and towels, clothing and food; and the medical officer of the ship cared for the sick and inaugurated what sanitary measures were possible under the circumstances. At Christmas 1920, the ship received two very touching testimonials from the refugees, one from the women and children and the other from the men. The originals of these testimonials are framed and hang in the Captain's cabin of the OLYMPIA.

April 15, 1920 - Rear Admiral Philip Andrews came on board from the U.S.S. PITTSBURG and hoisted his flag as Commander, U.S. Naval Forces Operating in Eastern Mediterranean.

May 4, 1920 - Underway for Venice, Italy. Commander of U.S. Naval Forces in Eastern Mediterranean on board. Arrived May 5th.

June 3, 1920 - Underway for Spalato, Dalmatia, arriving next day.

July 2, 1920 - Underway for Gravosa, Dalmatia, arriving next day.

July 12, 1920 - Underway for Spalato, Dalmatia, and arrived same evening.

August 26, 1920 - Underway for Venice, Italy, arriving next day.

September 6, 1920 - Underway for Spalato, arriving next day.

September 30, 1920 - Underway for Pola, Istria. Arrived October 1 and entered floating dry dock for overhaul. Left dry dock October 9.

October 11, 1920 - Underway for Venice, arriving same day.

October 13, 1920 - Underway for Brioni Island, Istria, arriving same day.

October 15, 1920 - Underway for Venice, arriving same day.

October 23, 1920 - Underway for Spalato, arriving next day.

November 7, 1920 - Assisted in the delivery to the Italian Government of the Ex-Austrian Battleship-RADETZSKY and Ex-Austrian Battleship ZRINYI. These two vessels held in trust by the United States after the Armistice were towed out to sea and delivered to the Italian Authorities as per agreement.

November 15, 1920 - Underway for Venice but on November 16 in accordance with orders by Radio changed course to proceed to Constantinople, Turkey. On the 17th orders were cancelled and the ship returned, arriving at Venice November 20th.

December 1, 1920 - Underway for Spalato, arriving next day, and left same day for Gravosa, Dalmatia, arriving December 3rd.

December 12, 1920 - Underway for Spalato, arriving same evening.

December 16, 1920 - Underway for Venice, arriving next day.

February 16, 1921 - Underway for Spalato, arriving next day.

February 23, 1921 - Underway for Brioni Islands, Istria.

March 6, 1921 - Underway for Sucurac, Castelli Bay, Dalmatia, arriving next day.

March 9, 1921 - Underway. Moved into Spalato Harbor and same day underway and arrived at Brioni Islands, Istria.

March 21, 1921 - Moved to Pola Harbor, Italy.

April 11, 1921 - Underway for Venice, Italy, arriving same day.

April 23, 1921 - Underway for Spalato, Dalmatia, arriving next day.

April 26, 1921 - Rear Admiral Philip Andrews left ship, his flag was lowered and transferred to the U.S.S. STURTEVANT and stood out of Spalato Harbor. OLYMPIA got underway to Naples, Italy, arriving April 29th.

May 4, 1921 - Underway for Gibraltar, Spain, arriving May 8th.

May 11, 1921 - Underway for Philadelphia, Pennsylvania.

May 25, 1921 - Arrived Navy Yard, Philadelphia, Pennsylvania.

June 9, 1921 - Rear Admiral Edward Simpson, U.S.N., Commander Train, Atlantic Fleet, shifted his flag from U.S.S. COLUMBIA to OLYMPIA and came on board with his staff.

June 15, 1921 - Underway for Lynnhaven Roads, Virginia. Arrived next day.

June 29, 1921 - Underway for New York. Arrived next day.

July 11, 1921 - Underway for Southern Drill Grounds 50 miles off Cape Charles Light Vessel. Arrived next day at Lynnhaven Roads.

July 14, 1921 - Underway to sea. Made several trips between Lynnhaven Roads and drill grounds preparing for destruction of Ex-German ships FRANKFORT and OSTERFRIESLAND.

July 21, 1921 - Lay to, and observed the bombing of the Ex-German Battleship OSTERFRIESLAND by airplane squadron and got underway for New York same night, arriving next day.

July 30, 1921 - Rear Admiral Edward Simpson, U.S.N., was detached from duty as Commander of Train, Atlantic Fleet. His flag was hauled down and Rear Admiral L.H. Chandler, U.S.N., assumed duty as Commander of Train, Atlantic Fleet and his flag was raised on OLYMPIA.

August 1, 1921 - Underway for Lynnhaven Roads, Virginia, arriving next day.

August 21, 1921 - Moved to Hampton Roads, Virginia.

August 23, 1921 - Returned to Lynnhaven Roads, Virginia.

August 25, 1921 - Moved to a point off Cape Henry, Virginia.

August 26, 1921 - Underway for New York, arriving next day.

September 6, 1921 - Underway for Lynnhaven Roads, arriving next day.

September 19, 1921 - Moved to Hampton Roads, Virginia.

September 20, 1921 - Moved to Norfolk Navy Yard and entered dry dock.

September 23, 1921 - Left dry dock and returned to Lynnhaven Roads.

September 25, 1921 - Moved to Hampton Roads, Virginia.

September 28, 1921 - Underway for Melville, R.I. Stopped off Montauk Point owing to fog and proceeded next day, arriving at Melville, R.I., September 30th.

October 3, 1921 Underway for Plymouth, England, and arrived October 14th.

October 23, 1921 Underway for Le Havre, France, arriving next day.

October 25, 1921 At 2:20 p.m. officers and crew were assembled on deck to take part in the ceremony of receiving the "Unknown Warrior." At 2:30 p.m. the escort and body of the "Unknown Warrior" arrived on dock and ceremonies were rendered by the French and American Expeditionary Forces, after which the "Unknown Warrior" was placed on board. At 3:28 p.m. got underway with an escort of 6 French Destroyers which parted company at 4:50 p.m. and the OLYMPIA proceeded bound for Washington, D.C.

November 7, 1921 - Reached the Virginia Capes, proceeded up Chesapeake Bay, and anchored near the mouth of the Potomac River.

November 8, 1921 - At 8:00 p.m. underway, steaming up Potomac River.

November 9, 1921 - Arrived and anchored at Indian Head at 2:00 a.m. At 12:38 p.m. proceeded up Potomac River. At 1:47 p.m. passed Fort Washington which fired 21 minute guns' salute. At 2:00 p.m. passed

Mt. Vernon and rendered prescribed honors. At 3:01 p.m. moored to Navy Yard Dock, Washington, D.C. At 4:00 p.m. began moving body of "Unknown Soldier", started salute of 21 guns. At 4:06 p.m. the body was placed on Army Caisson and was officially delivered into the custody of the Army by Admiral Chandler. At 4:08 p.m. the cortege was formed and the body left the dock followed by the officials.

November 15, 1921 - Underway for Philadelphia, Pennsylvania. Stood down Potomac River and arrived Navy Yard, Philadelphia, next night.

December 12, 1921 - Rear Admiral L. H. Chandler hauled down his flag and gave up Command of Train, U.S. Atlantic Fleet, turning his command over to Captain T. L. Johnson, U.S.N.

December 27, 1921 - Captain Louis R. de Steiguer took Command as Commander Train U.S. Atlantic Fleet.

January 7, 1922 - Captain H.L. Wyman relieved as Commanding Officer and Captain W.C. Asserson assumed Command. Got underway for Guacanayabo Gulf, Cuba, stopping at Guantanamo Bay, January 11th, and arrived January 12, 1922.

February 3, 1922 - Underway for Guantanamo Bay, arriving next day.

April 22, 1922 - Underway for Philadelphia, Pa. and arrived at League Island Navy Yard April 27th.

April 29, 1922 - Commander of Train, Captain Louis R. de Steiguer left ship and transferred his flag to U.S.S. RELIEF.

May 16, 1922 - Entered dry dock, Navy Yard, Philadelphia, Pennsylvania.

May 18, 1922 - Left dry dock, Navy Yard, Philadelphia, Pennsylvania.

May 22, 1922 - Underway for Hampton Roads, Virginia, arriving next day.

May 26, 1922 - Underway for Annapolis, Maryland, arriving next day.

June 5, 1922 - Having received on board Midshipmen from Naval Academy, underway with U.S.S. FLORIDA, U.S.S. NORTH DAKOTA and U.S.S. DELAWARE on Cruise.

June 13, 1922 - Stood into entrance of Panama Canal and anchored in Gatun Lake, Canal Zone, Panama.

June 19, 1922 - Underway, and arrived at Colon Coaling Station same day.

June 20, 1922 - Underway for Fort Castries, St. Lucia, British West Indies. Arrived June 26th.

July 3, 1922 - Underway for Basse Terre, St. Kitts or St. Christopher, British West Indies. Arrived July 4th.

July 7, 1922 - Underway for Great Harbor, Culebra, Puerto Rico. Arrived next day.

July 21, 1922 - Moved to San Juan Harbor, Puerto Rico.

July 25, 1922 - Underway for Halifax, Nova Scotia and arrived August 1, 1922.

August 13 1922 - Underway for Hampton Roads, Virginia. Arrived August 17th. Coaled and moved to Lynnhaven Roads.

August 21, 1922 - Underway for Southern Drill Grounds. Arrived same day.

September 1, 1922 - Arrived Philadelphia Navy Yard.

December 9, 1922 - Decommissioned at Philadelphia Naval Yard.

1926 - Formed part of the Navy's exhibit at the Philadelphia Sesqui-Centennial Exposition.

June 30, 1931 - Reclassified as IX-40.

This information is derived from documents compiled in October 1957 by the Division of Naval History, Navy Department. The documents are located in the Ships' History Section, Washington Navy Yard, Washington, D.C.

APPENDIX F

Official Naval Obituary for Admiral Dewey

ADMIRAL OF THE NAVY GEORGE DEWEY
UNITED STATES NAVY, DECEASED

George Dewey, the only officer of the United States Navy ever to hold the rank of Admiral of the Navy, was born on December 26, 1837, Montpelier, Vermont. On September 23, 1854, he was appointed Acting Midshipman from the First Congressional District of Vermont, and upon graduation from the U.S. Naval Academy, Annapolis, Maryland in June 1858, was warranted Midshipman to date from June 11 of that year. He became a Passed Midshipman on January 19, 1861, and on February 28, same year, he was warranted Master. His subsequent promotions were as follows: Lieutenant, from April 19, 1861; Lieutenant Commander, March 3, 1865; Commander, April 13, 1872; Captain, September 27, 1884; Commodore, February 28, 1896; Rear Admiral, May 11, 1898; Admiral, March 2, 1899; and Admiral of the Navy, on March 24, 1903, to date from March 2, 1899.

During the period April 26, 1861 until August 30, 1867, he had consecutive service in the *USS Mississippi*, *USS Brooklyn*, *USS Agawam*, *USS Colorado*, *USS Kearsarge*, *USS Canadaigua*, and return duty in the *Colorado*. When he was detached from the *Colorado* he was directed to await orders of October 1, 1867 which returned him to the Naval Academy for a tour of duty ending in September 1870. On September 28, he assumed command of the *USS Narragansett*, and in February 1871 was transferred to command of the *USS Supply*, hospital ship. On July 27, 1871 he was ordered to the Navy Yard, Boston, Massachusetts, and after five months' duty there, and brief instruction at the Naval Torpedo Station, Newport, Rhode Island, he again commanded the *Narragansett* from March 11, 1873 to August 1875.

Ordered on August 25, 1875, to report as Lighthouse Inspector, Second Naval District, with headquarters in New York, New York, he served in that capacity until August 1, 1877, as a member of the Lighthouse Board for eight months thereafter. On May 1, 1878 he became Secretary of the Lighthouse Board. On October 25, 1882 he assumed command of the *USS Junaita*, remaining at sea until ordered to report on August 1, 1884, to the Navy Department, Washington, D.C. From October 7, 1884 until July 1889 he had duty afloat in command first of the *USS Dolphin* and later of the *USS Pensacola*. On July 20, 1889, he was commissioned Chief of the Bureau of Equipment, Navy Department Washington, D.C., and assumed the duties of that office on August 1.

His term as Chief of the Bureau of Equipment, ended by resignation on June 30, 1893 he again became a member of the Lighthouse Board.

On November 5, 1895 he reported for duty as President of the Board of Inspection and Survey, Navy Department. On November 30, 1897, he was ordered to the Asiatic Station, and proceeding by steamer, he assumed command on January 3, 1898, his flag in the protected cruiser, *USS Olympia*, Captain Charles V. Gridley, Commanding. The Spanish-American War action at Manila, Philippine Islands, May 1, 1898, not only gave birth to the historical expression "You may Fire when you are ready, Gridley" but also liquidated the Spanish Fleet and installations in the Harbor without loss of men to the U.S. Fleet.⁵³

On May 1898, Admiral Dewey (then Commodore) was given a vote of thanks by the Congress of the United States and three days later was commissioned Rear Admiral, to date from May 11, 1898. That promotion was an advancement of one grade for highly distinguished conduct in conflict with the enemy as displayed by him in the destruction of the Spanish Fleet and batteries in the harbor of Manila, Philippine Islands. May 1, 1898. He was relieved of command of Asiatic Station on October 4, 1899, and ordered to duty in the Navy Department, Washington, D. C. On March 29, 1900, he was designated President of the General Board.

An Act of Congress, March 2, 1899, created the rank of Admiral of the Navy. It provided that when such office became vacant either by death or otherwise, the office would cease to exist. On March 24, 1903, Dewey, then Admiral, was commissioned Admiral of the Navy, to date from March 2, 1899, and became the only officer of the United States Navy who was ever so commissioned. He held that rank until his death in Washington, D.C., on January 16, 1917.

The body of Admiral Dewey was interred in Arlington National Cemetery, Arlington, Virginia, on January 20, 1917. At the request of his widow, his remains were reinterred in the crypt of Bethlehem Chapel, at the Protestant Episcopal Cathedrals, Mount Saint Albans Washington, D.C. on March 28, 1925.

Admiral Dewey held the Civil War Medal; the Spanish Campaign; the Philippine Campaign Medal; and the Dewey Medal. The *USS Dewey* (DD 349) was named to honor his memory.

The document is located in the Ships' History Section, Washington Navy Yard, Washington, D.C.

⁵³George Dewey, Admiral of the Navy, Washington D.C., to Secretary of the Navy, Washington, D.C. 18 September, 1903. Original in the Ships History Section, Library, Washington Navy Yard.

APPENDIX G

Admiral Dewey's Official Report of the Battle of Manila Bay
No. 240-D

UNITED STATES NAVAL FORCE ON ASIATIC STATION.

FLAGSHIP OLYMPIA

CAVITE, PHILIPPINE ISLANDS,

MAY 4, 1898

Sir:

I have the honor to submit the following report of the operations of the squadron under my command:

1. The squadron left Mirs Bay on April 27th, immediately on the arrival of Mr. O.F. Williams, U.S. Consul at Manila, who brought important information and who accompanies the squadron.

2. Arrived off Bolinao on the morning of April 30th, and, finding no vessels there, proceeded down the coast and arrived off the entrance to Manila Bay on the same afternoon.

3. The *Boston* and the *Concord* were sent to reconnoitre Port Subic, I having been informed that the enemy intended to take position there. A thorough search of the port was made by the *Boston* and *Concord*, but the Spanish fleet was not found, although from a letter afterwards found in the arsenal (enclosed with translation), it appears that it had been their intention to go there.

4. Entered the Boca Grande or south channel at 11:30 P.M., steaming in column, at distance, at eight knots. After the squadron had passed, a battery on the south side of the channel opened fire, none of the shots taking effect. The *Boston* and *McCulloch* returned the fire.

5. The squadron proceeded across the bay at slow speed and arrived off Manila at day break, and was fired at 5:16 A.M. by three batteries at Manila and two near Cavite, and by the Spanish fleet anchored in an approximately east and west line across the mouth of Bakor Bay, with their left in shoal water in Canacao Bay.

6. The squadron then proceeded to the attack., the Flagship *Olympia*, under my personal direction, leading, followed at distance by the *Baltimore*, *Raleigh*, *Petrel*, *Concord* and *Boston*, in the order named, which formation was maintained throughout the action. The

squadron opened fire at 5:41 A.M. While advancing to the attack, two mines were exploded ahead of the Flagship, too far to be effective.

7. The squadron maintained a continuous and precise fire at ranges varying from 5000 to 2000 yards, countermarching in a line approximately parallel to that of the Spanish fleet. The enemy's fire was vigorous but generally ineffective.

8. Early in the engagement two launches put out toward the *Olympia* with the apparent intention of using torpedoes. One was sunk and the other disabled by our fire and beached, before an opportunity occurred to fire torpedoes. At 7:00 A.M., the Spanish Flagship *Reina Christina* made a desperate attempt to leave the line and come out to engage at short range, but was received with such galling fire, the entire battery of the *Olympia* being concentrated upon her, that she was barely able to return to the shelter of the point. The fires started in her by our shell at this time were not extinguished until she sank.

9. At 7:35 A.M., it having been erroneously reported to me that only fifteen rounds per gun remained for the five inch rapid fire battery, I ceased firing and withdrew the squadron for consultation and a re-distribution of ammunition if necessary.

10. The three batteries at Manila had kept up a continuous fire from the beginning of the engagement, which fire was not returned by this squadron. The first of these batteries was situated on the south mole-head at the entrance to the Pasig River, the second on the south bastion of the walled city of Manila, and the third at Malate, about one-half mile further south. At this point I sent a message to the Governor General to the effect that if the batteries did not cease firing the city would be shelled. This had the effect of silencing them.

11. At 11:16 A.M., finding that the report of scarcity of ammunition was incorrect, I returned with the squadron to the attack. By this time the flagship and almost the entire squadron ceased firing, the batteries being silenced and the ships sunk, burnt and deserted.

12. At 12:40 P.M. the squadron returned and anchored off Manila, the *Petrel* being left behind to complete the destruction of the smaller gunboats, which were behind the point of Cavite. This duty was performed by Commander E.P. Wood in the most expeditious and complete manner possible.

13. The Spanish lost the following vessels: sunk: *Reina Christina*, *Castilla*, *Don Antonio de Ulloa*.

Burnt: *Don Juan de Austria*, *Isla de Luzon*, *Isla de Cuba*, *General Lezo*, *Marques del Duero*, *El Correo*, *Velasco* and *Isla de Mindanao* (transport).

Captured: *Rapido* and *Hercules* (tugs) and several small launches.

14. I am unable to obtain complete accounts of the enemy's killed and wounded, but believe their loss to be very heavy. The *Reina Christina* alone had 150 killed, including the captain, and 90 wounded.

15. I am happy to report that the damage done to the squadron under my command was inconsiderable. There were none killed, and only seven men in the squadron very slightly wounded. As will be seen by the reports of the Commanding Officers which are herewith enclosed, several of the vessels were struck and even penetrated, but the damage was of the slightest and the squadron is in as good condition now as before the battle.

16. I beg to state to the department that I doubt if any Commander-in-Chief, under similar circumstances, was ever served by more loyal, efficient and gallant captains than those of the squadron now under my command. Captain Frank Wildes, commanding the *Boston*, volunteered to remain in command of his vessel although his relief arrived before leaving Hong Kong.

17. Assistant Surgeon C.P. Kindleborger of the *Olympia* and Gunner J.C. Evans of the *Boston*, also volunteered to remain after orders detaching them had arrived.

18. The conduct of my personal staff was excellent. Commander B.P. Lamberton, Chief of Staff, was a volunteer for that position and gave most efficient aid. Lieutenant T.M. Bumbry, Flag Lieutenant, and Ensign W.P. Scott, Aide, performed their duties as signal officers in a highly creditable manner. The *Olympia* being short of officers for the battery, Ensign H.H. Caldwell, Flag Secretary, volunteered for and was assigned to a sub-division of the five-inch battery.

19. Mr. J.L. Stickney, formerly an officer in the U.S. Navy, and now correspondent for the New York Herald, volunteered for duty as my aide, and rendered valuable service.

20. While leaving to the Commanding Officers to comment on the conduct of the officers and men under their commands, I desire especially to mention the coolness of Lieutenant C.G. Calkins, the Navigator of the *Olympia*, who came under my personal observation, being on the bridge with me throughout the entire action and giving the ranges to the guns with an accuracy that was proven by the excellence of the firing.

21. On May 2nd, the day following the engagement, the squadron again went to Cavite, where it remains. A landing party was sent to destroy the guns and magazines of the batteries there. The first battery, near the end of Sangley Point was composed of two modern Trubia B.L. Rifles of 15 c/m calibre. The second was a mile further down the beach and consisted of a modern 12 c/m B.L. Rifle behind improvised earthworks.

22. On the 3rd the military forces evacuated the Cavite Arsenal which was taken possession of by a landing party. On the same day the *Raleigh* and *Baltimore* secured the surrender of these batteries on Corregidor Island, paroling the garrison and destroying the guns.

23. On the morning of May 4th, the transport *Manila*, which had been aground in Bakor Bay was towed off and made a prize.

Very respectfully, your obedient servant,

George Dewey

Commodore, U.S. Navy,
Commanding U.S. Naval Force on Asiatic Station.

The Secretary of the Navy,
Washington, D.C.
(Bureau of Navigation.)

The official battle report is located in the Ships' History Section, Washington Navy Yard, Washington, D.C.

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Figure 1
Location Map - U.S.S. Olympia
Quadrangle: Philadelphia, PA. - N.J. 1:24000

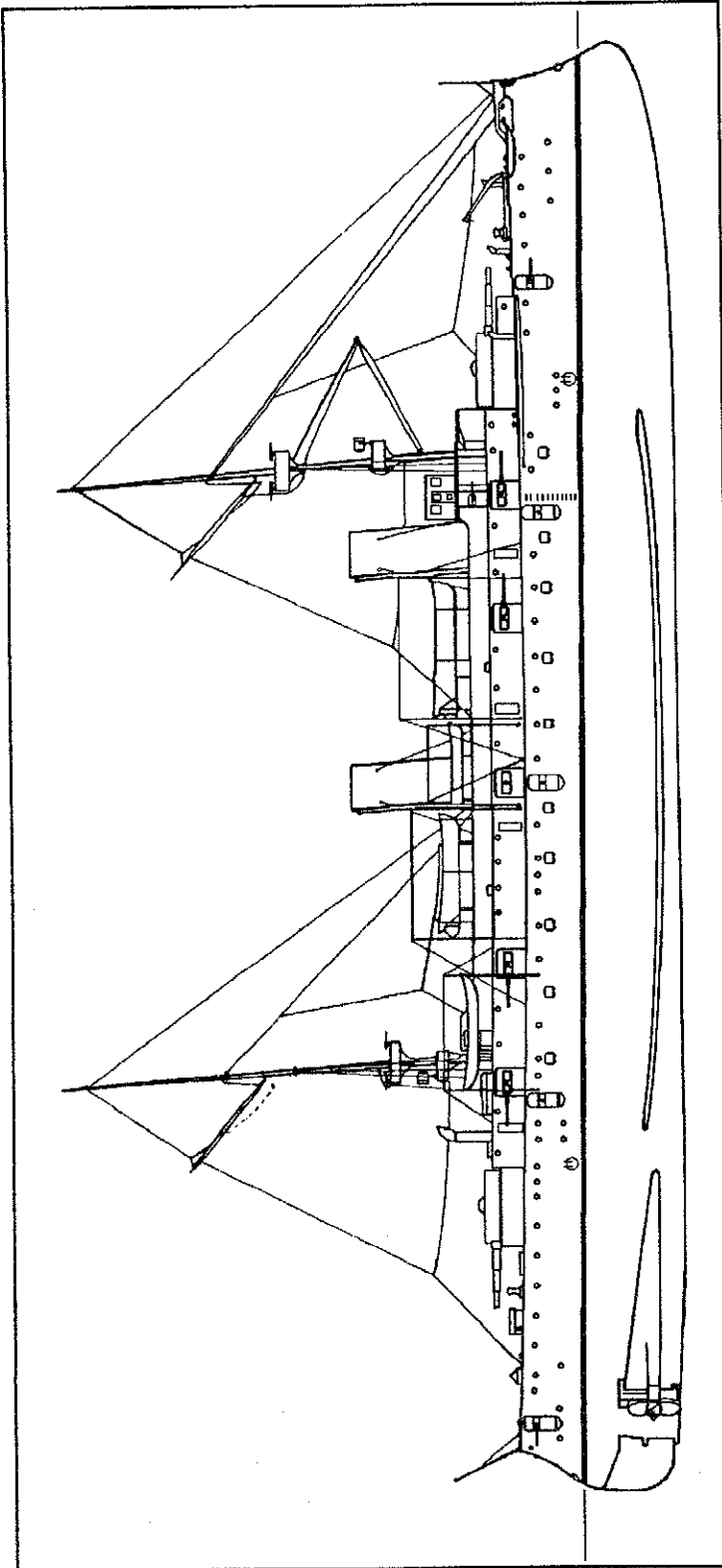


Figure 2

Profile of U.S.S. Olympia ca. 1898

Note original armament of 4 - 8", 35 caliber breech loading rifles in armored turrets and 10 5" rifles mounted in a main deck casemate. Six torpedo tubes are mounted just above the water line in bow and stern and below the starboard bow and quarter.

Source: Plans listed in Sources of Information, "Engineering Drawings" and in John D. U.S. Navy (Retired), The American Steel Navy, Annapolis: Naval Institute Press, 1972, 371. Corel50 Software used to create sketch by R.C. Stewart

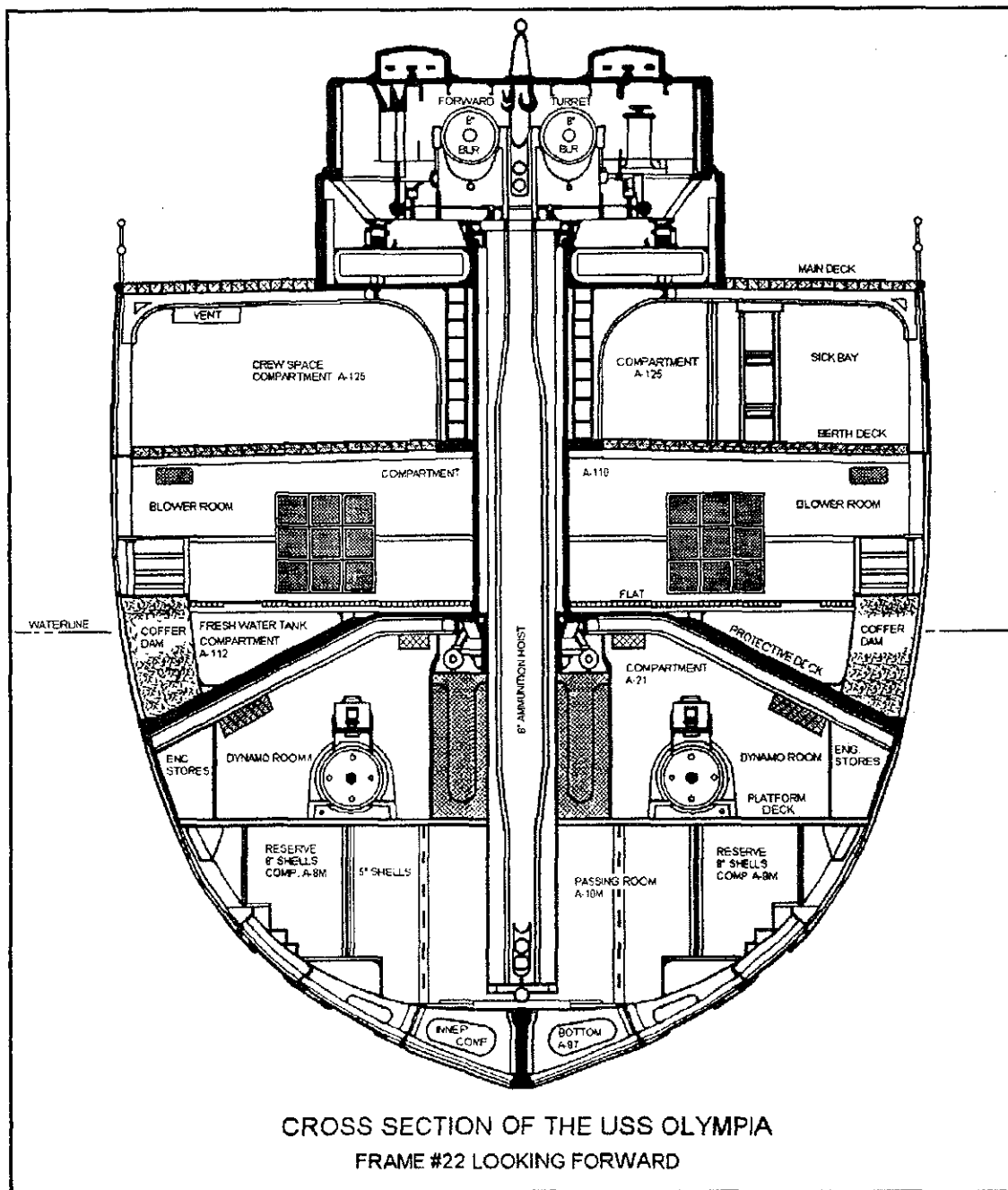
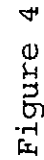


Figure 3

Source: Union Iron Works Sketch found on the U.S.S. Olympia. Corel50 Software used to add identifying labels and filter out damage.



Inboard profile based on re-fit prior to World War I. Original 8", 35 caliber breech loading rifles in armored turrets were replaced with 5" rapid fire guns in open barbettes on February 18, 1918. Radio house was added ca. 1903.

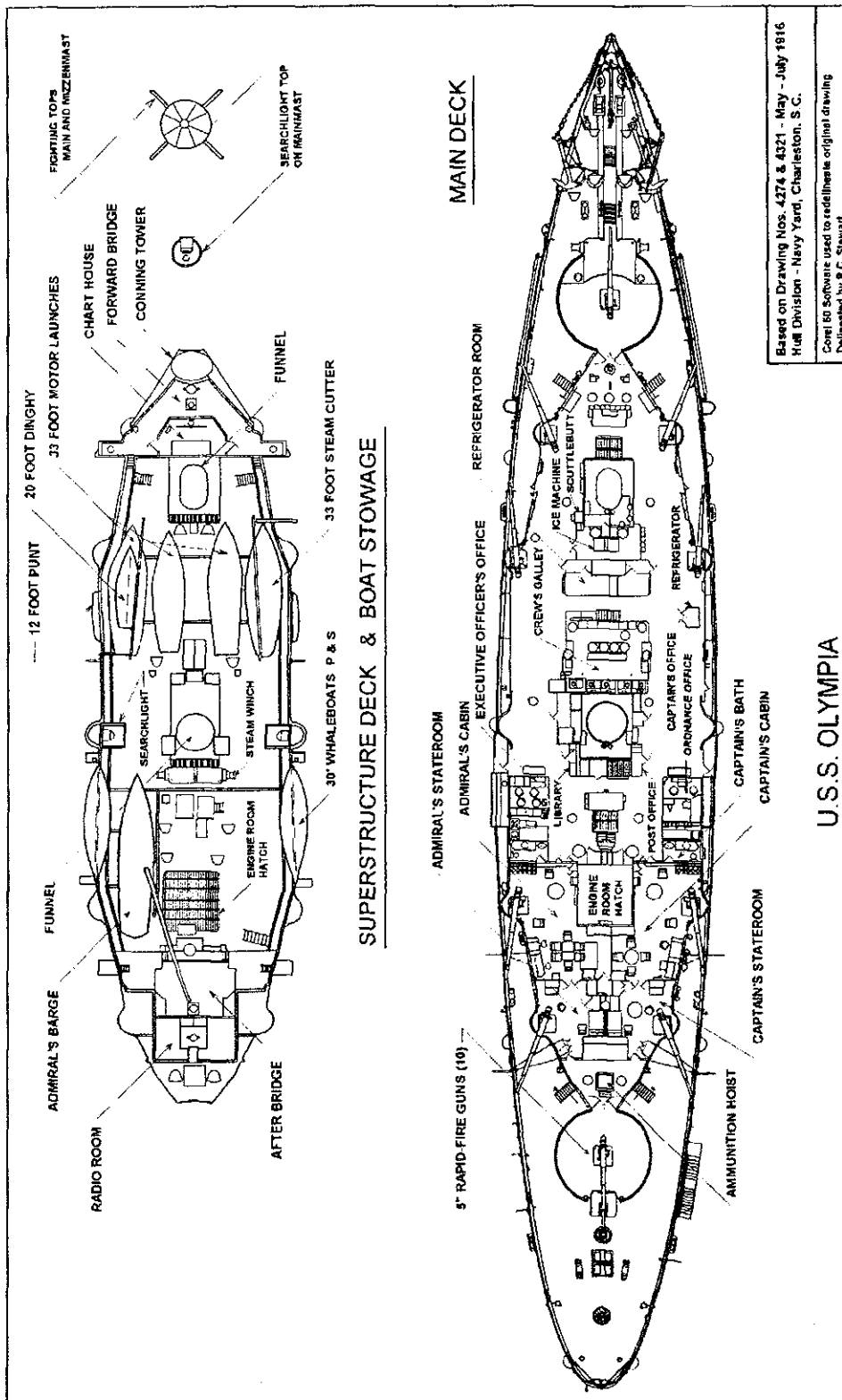
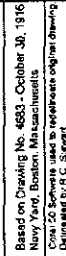


Figure 5

Superstructure Deck and Main Deck of U.S.S. Olympia. Note casemate construction surrounding 5" rapid-fire guns.



Protective Deck and Flats. Note coffer dam which was originally filled with "Woodite" (treated cellulose made from corn cobs) lining inside of hull above and below the water line.

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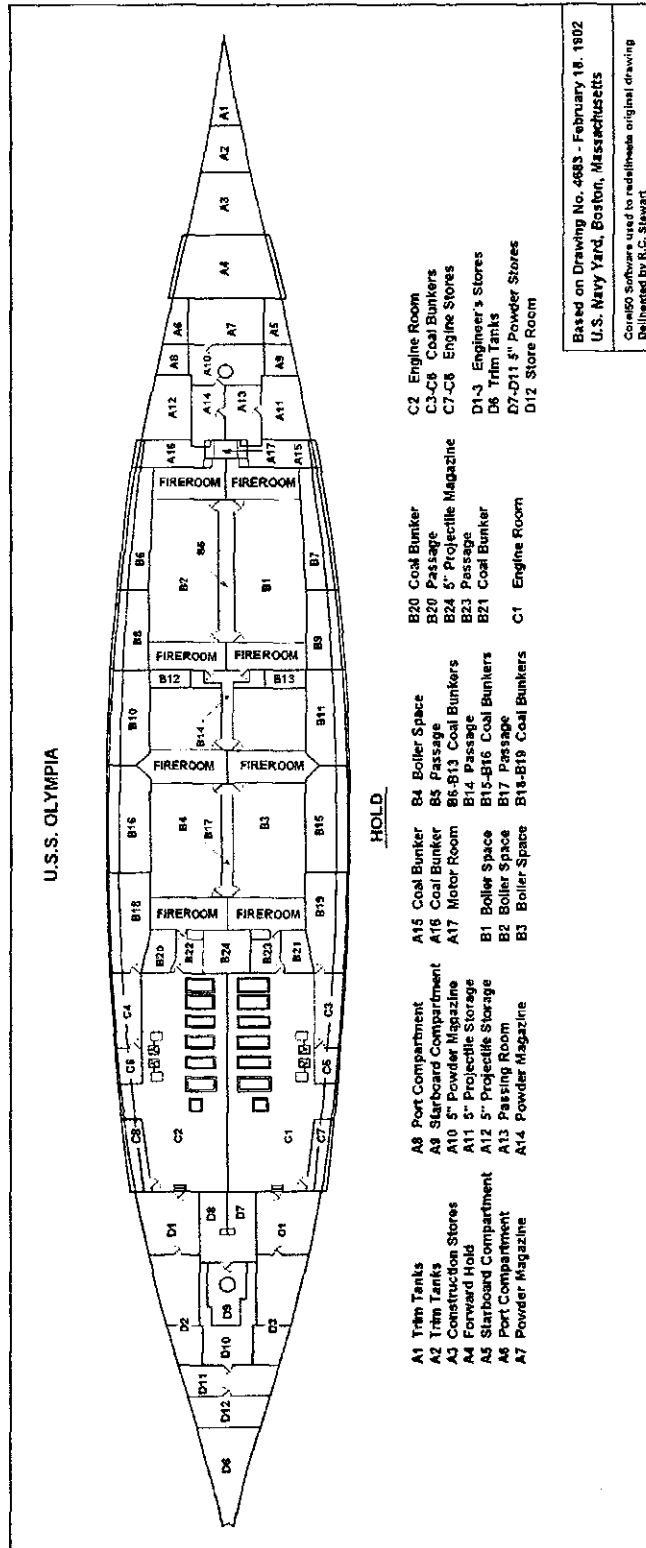


Figure 7

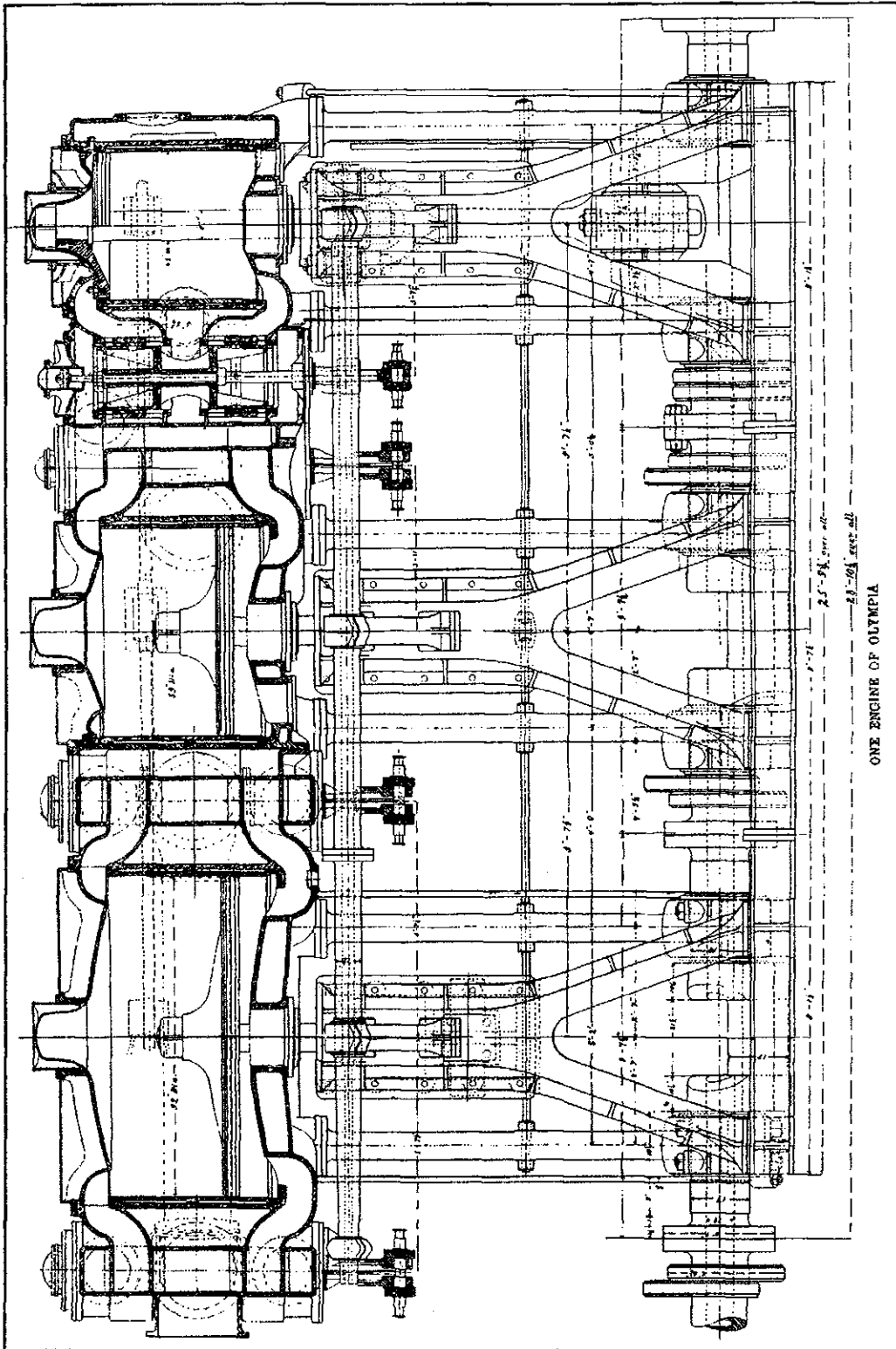


Figure 8

Sectioned profile of one of Olympia's engines. Digitized delineation based on a drawing included in Frank M. Bennett, The Steam Navy of the United States, Sine loco, 1896. Volume in the library of the Philadelphia Independence Seaport Museum. Corel50 Software used to redelineate original.

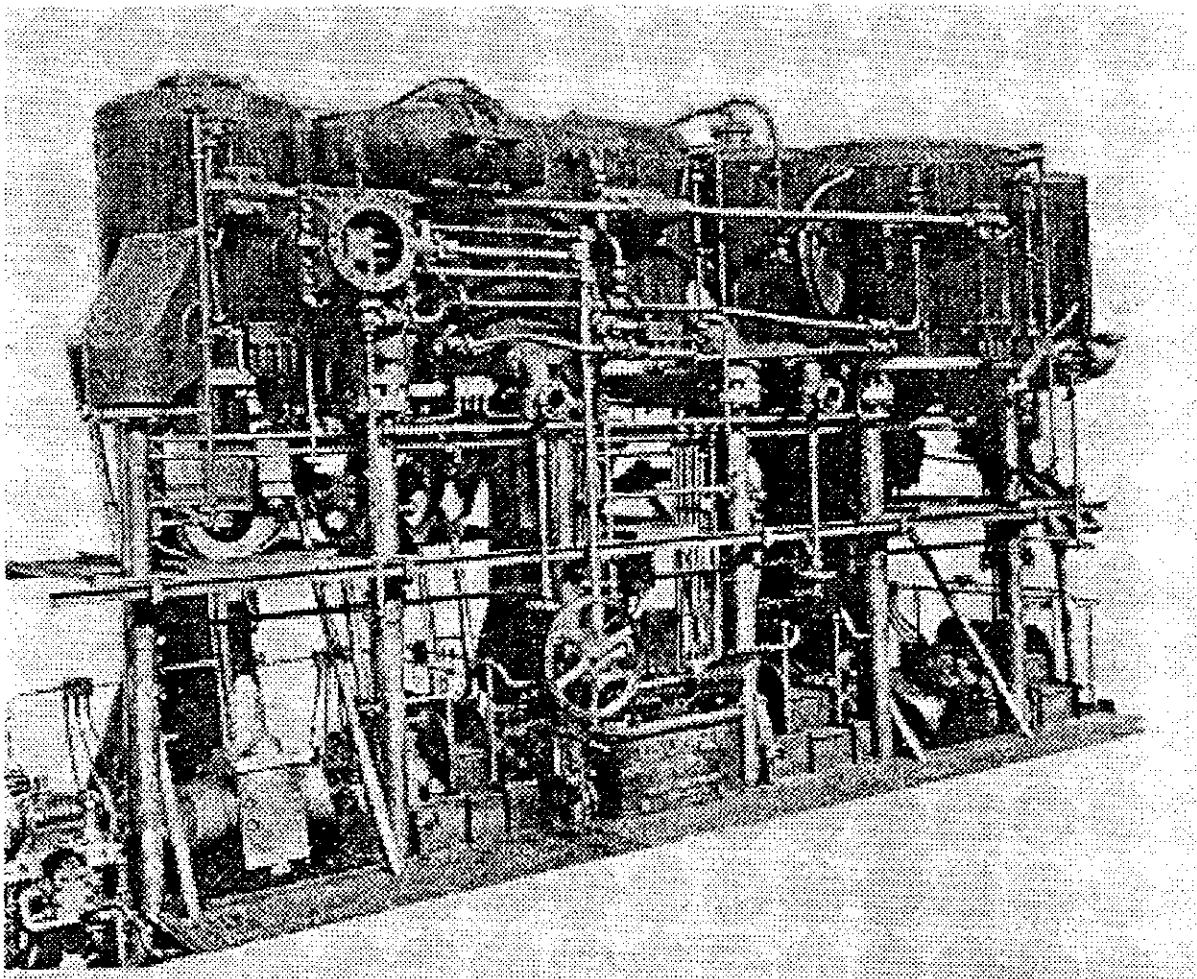


Figure 9

Historic photograph of one of *Olympia's* engines. Source: R. E. Carney, "Contract Trial of the *U.S.S. Olympia*." Journal of the American Society of Naval Engineers, Vol. VI, 1894, p. 240.

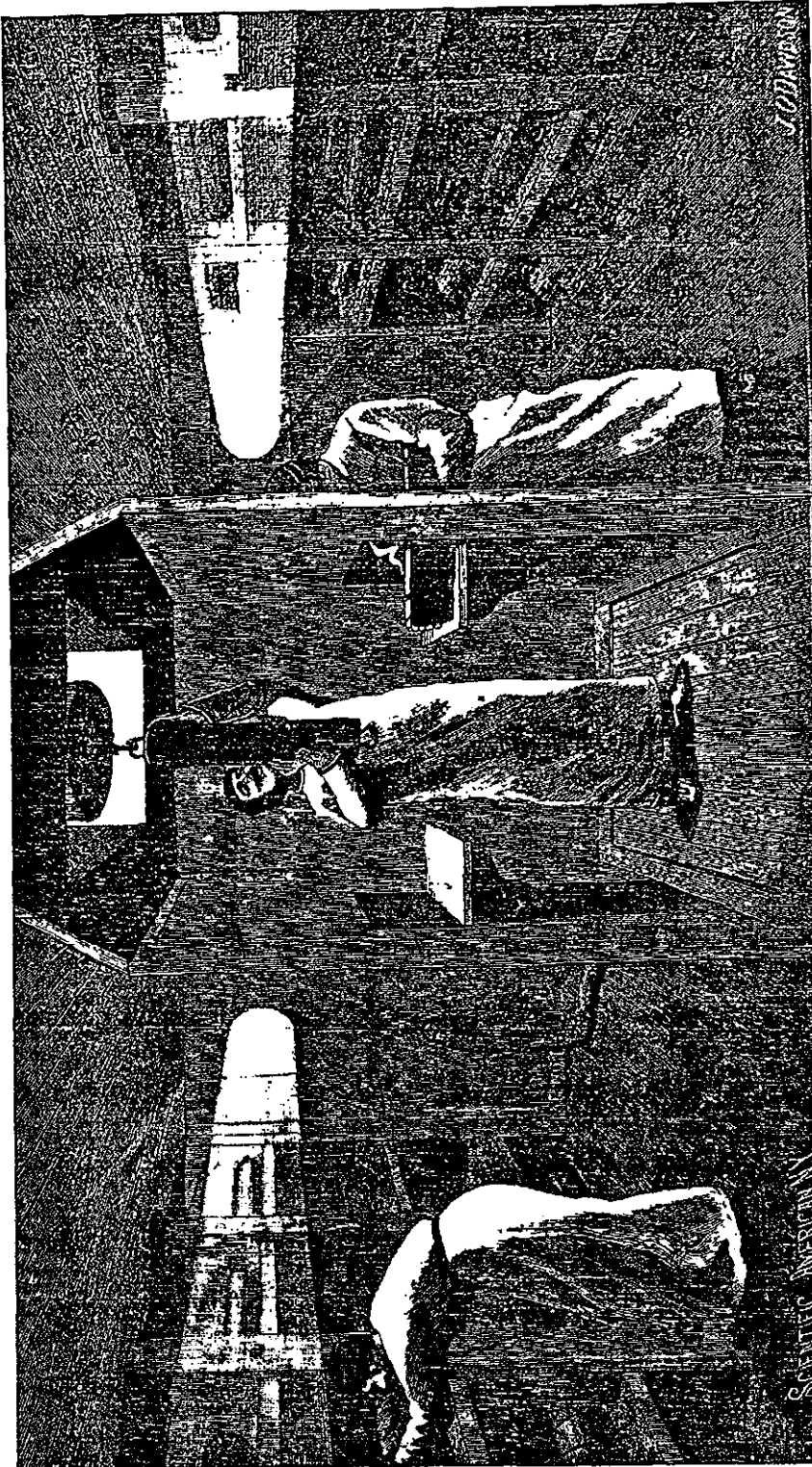


Figure 10

Magazines and ammunition hoist on the U.S.S. Atlanta. Note that illumination is provided by a lamp located behind a heavy glass plate. The *Olympia* used a similar layout. The crew wear shrouds to minimize the danger of contact with explosive material and spark generation. Source: "The United States Cruiser Atlanta," Scientific American, December 15, 1894.

THE "BOUNTING BILLOW."

Published in the interests of American Men-o'-Warsmen.

Published at intervals
on U. S. F. S. Olympia.

MANILA, PHILIPPINE ISLANDS, JUNE, 1898.

{ Vol. I.
No. 5.

THE BATTLE OF MANILA BAY

"We Came! We Saw! We Conquered!"



"Twas for Cuba and our honor, to avenge our heroes slain,
That victory wreathed our banner, when we fought the ships of Spain."

Figure 11 - Cover Page of Olympia's newspaper. Naval History Center, Washington Navy Yard, Washington D.C.

THE "BOUNDING BILLOW."

... Published in the interests of American Men-o'-Warsmen. ...

Published at intervals
on U. S. F.S. Olympia.

MANILA, P. I., AUG.-SEPT., 1898.

{ Vol. I.
{ No. 6.

Power and Progress, Peace and Prosperity.

The Fall of Manila.



VICTORY.

It will live in deathless story how our hanner led the fight,
In all its pristine glory to do battle for the right,
And where oppression rages, in majesty sublime
Columbia's battle wages, on its sinblack list of crime.

Figure 12 - Cover Page of *Olympia's* newspaper. Naval History Center, Washington Navy Yard, Washington D.C.

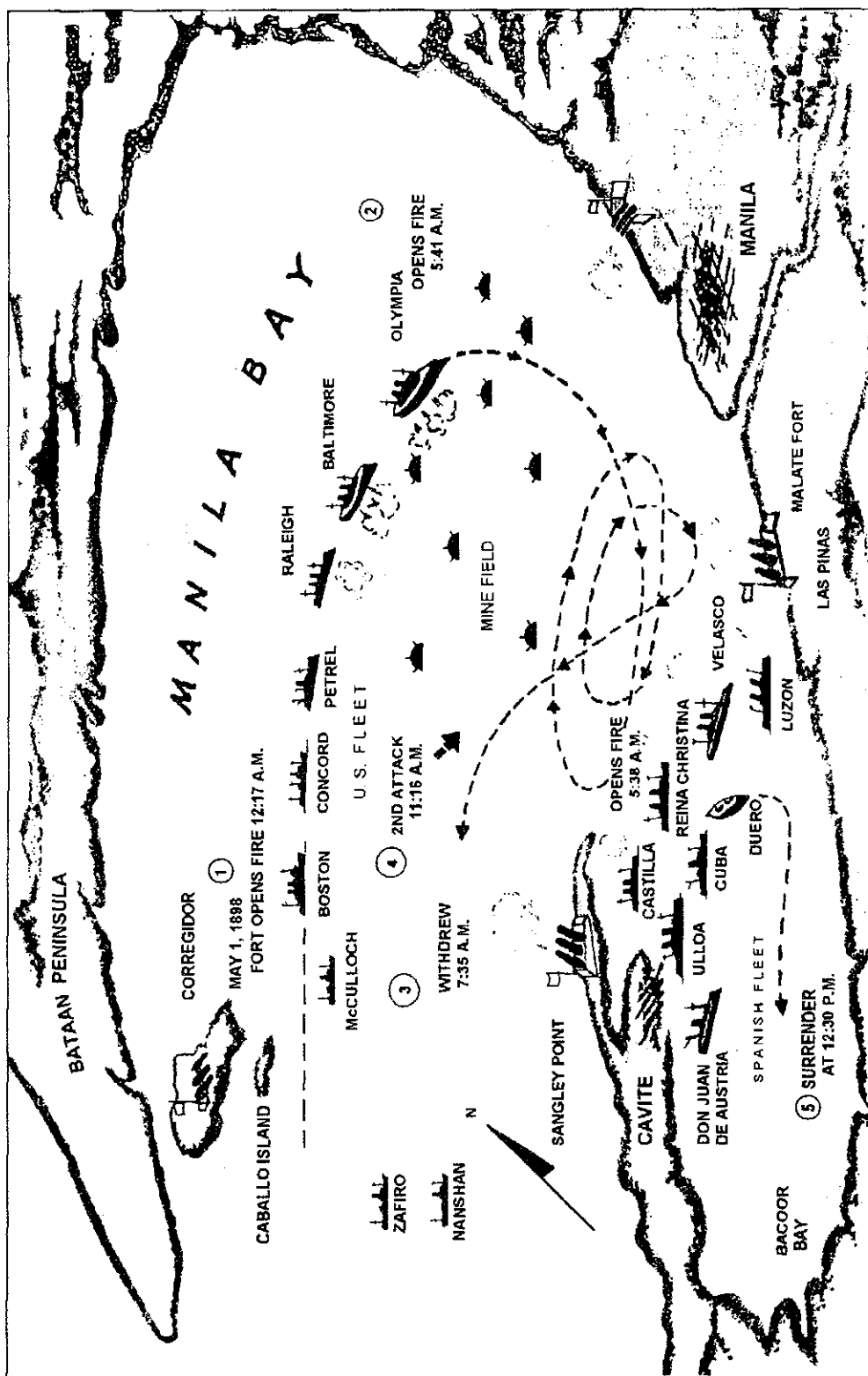


Figure 13

Sketch of the Battle of Manila Bay. Based on a sketch found in the library of the Philadelphia Independence Seaport Museum with supplemental historical information from Admiral Dewey's Official Battle Report. Corel50 Software used to add labels.

Table I

Comparison of Warships built in the 1890s

Vessel	Launched	Displacement tons	Length feet	Beam feet	Max. Speed knots
<i>Olympia</i>	11-5-92	5,870	340	53.0	21.7
<i>Oregon</i>	10-26-93	10,230	348	69.5	16.2
<i>Texas</i>		6-28-92	6335	290	64.1
<i>Indiana</i>	3-7-95	10,281	348	69.0	15.6
<i>Raleigh</i>	4---92	3180	300	49.0	20.0
<i>Columbia</i>	11---93	7350	412	58.0	21.0
<i>Iowa</i>		11,296	360	72.2	16.0
<i>Maine</i>	11-18-90	6682	324	57.0	17.0
<i>Cincinnati</i>	1894	11,800	305	42	19.0
<i>Ruric</i> (Russia)		10,928	438	67	
<i>Imperieuse</i> (Russia)		8,400			
<i>Blake</i> (UK)		9,000			
<i>Edgar</i> (UK)		7,300			